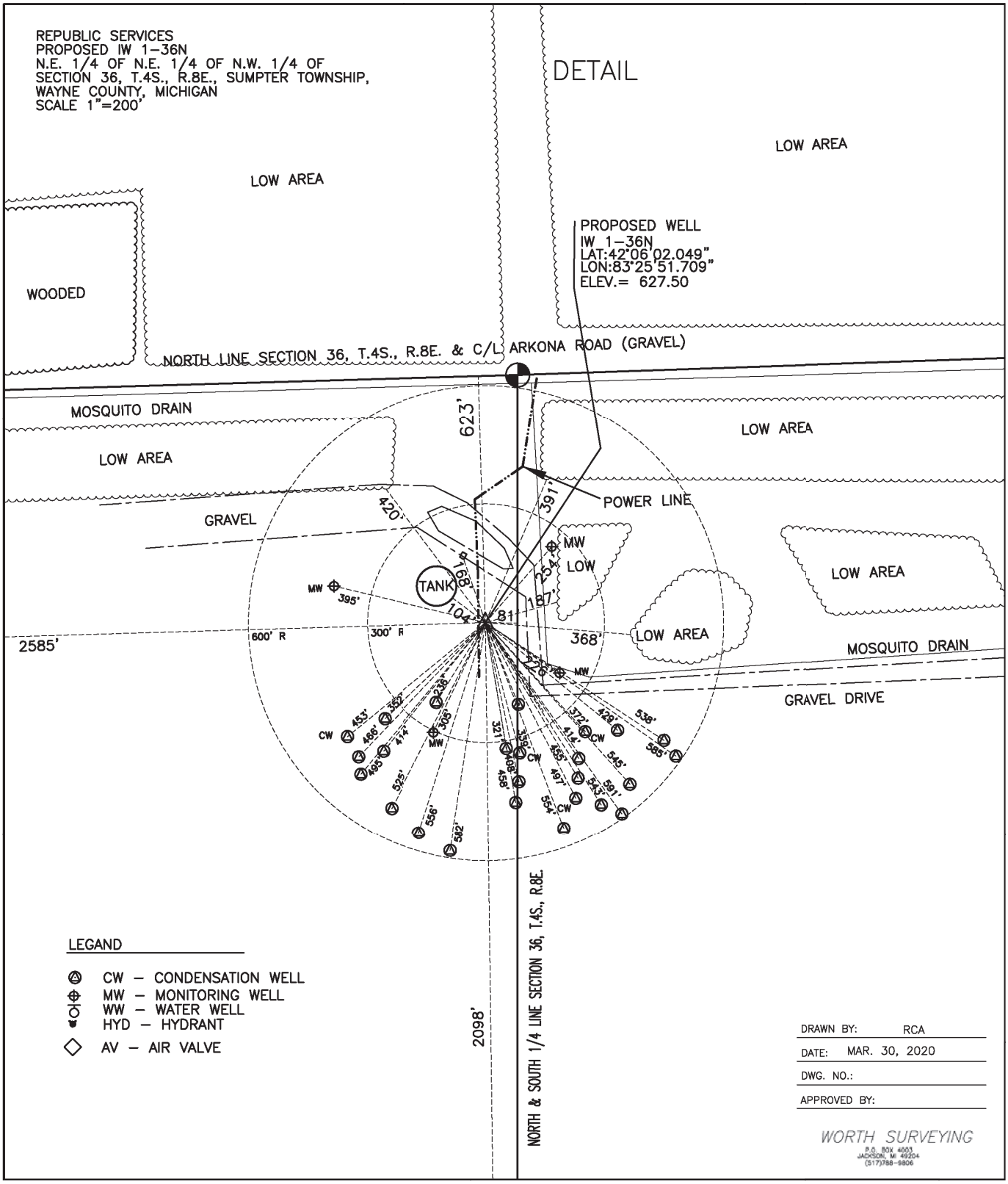


REPUBLIC SERVICES

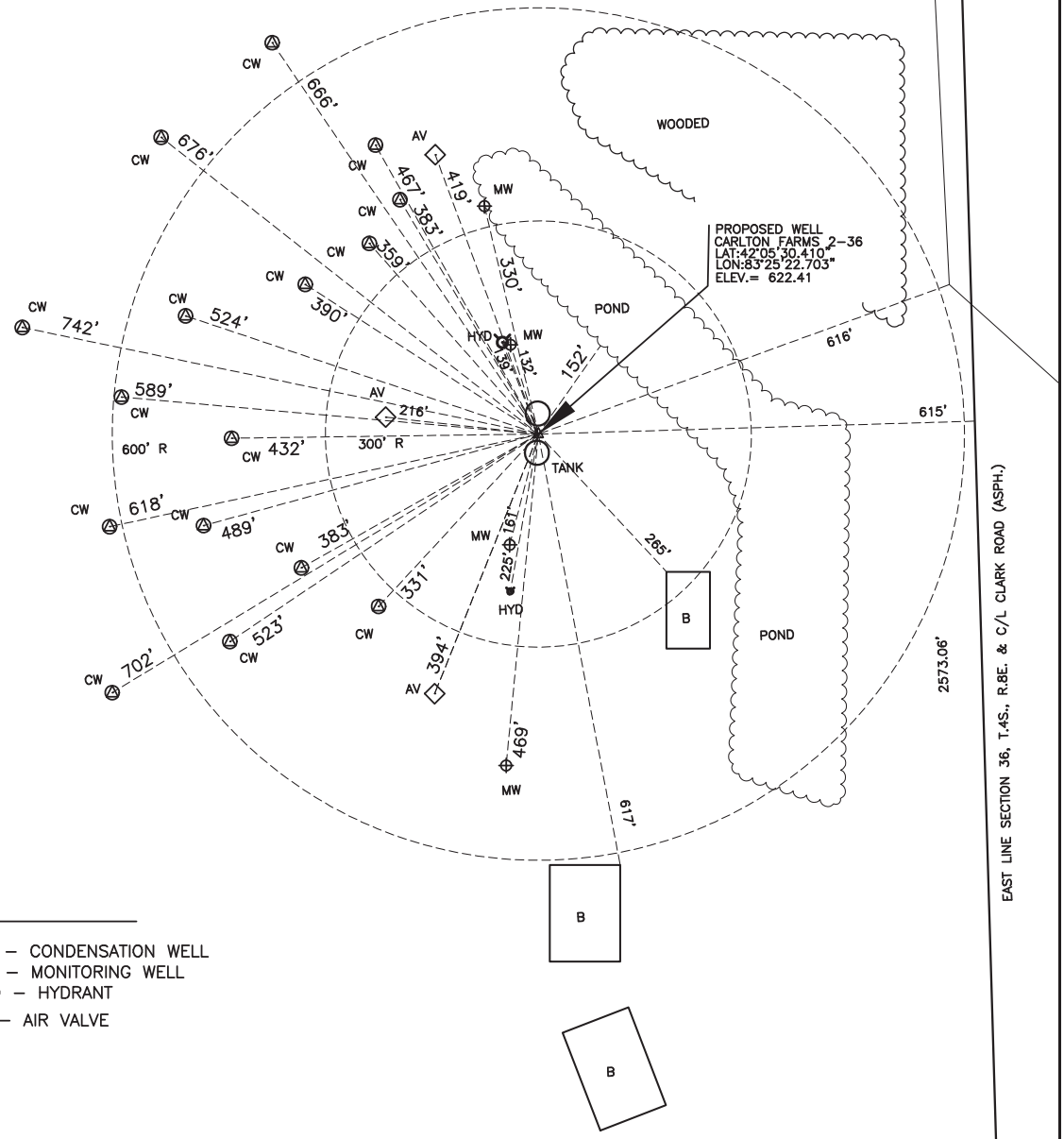
Figure A.4-8c
Detailed Survey Plat,
IW#1-36N
2019 Permit Application

Scale: See Figure Scale	Date: May 2020	
2019_CFL_EGLE_Fig_A.4-08c.pdf	By: WEK	Checked: CW

Petrotek
5935 South Zang Street, Suite 200
Littleton, Colorado 80127 USA
303-290-9414
www.petrotek.com

DEEP BLU, LLC
PROPOSED CARLTON FARMS 2-36
S.E. 1/4 OF N.E. 1/4 OF S.E. 1/4 OF
SECTION 36, T.4S., R.8E., SUMPTER TOWNSHIP,
WAYNE COUNTY, MICHIGAN
SCALE 1"=200'

DETAIL DRAWING



LEGAND

- CW – CONDENSATION WELL
- MW – MONITORING WELL
- HYD – HYDRANT
- AV – AIR VALVE

DRAWN BY:	RCA
DATE:	AUGUST 1, 2019
DWG. NO.:	
APPROVED BY:	

WORTH SURVEYING
P.O. BOX 4003
JACKSON, MI 49204
(517)788-9806

REPUBLIC SERVICES

Figure A.4-8d
Detailed Survey Plat,
IW#2-36E
2019 Permit Application

Scale: See Figure Scale	Date: September 2019	
2019_CFL_EGLE_Fig_A.4-08d.pdf	By: WEK	Checked: CW

Petrotek
5935 South Zang Street, Suite 200
Littleton, Colorado 80127 USA
303-290-9414
www.petrotek.com

A.5 Form EQP 7200-4, Wellhead Blowout Control System.

The blowout control system for drilling the proposed wells is presented in form EQP-7200-4, presented at the end of this Section (A.5).

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

WELLHEAD BLOWOUT CONTROL SYSTEM

Worksheet supplement for "Application for Permit to Drill or Deepen a Well"

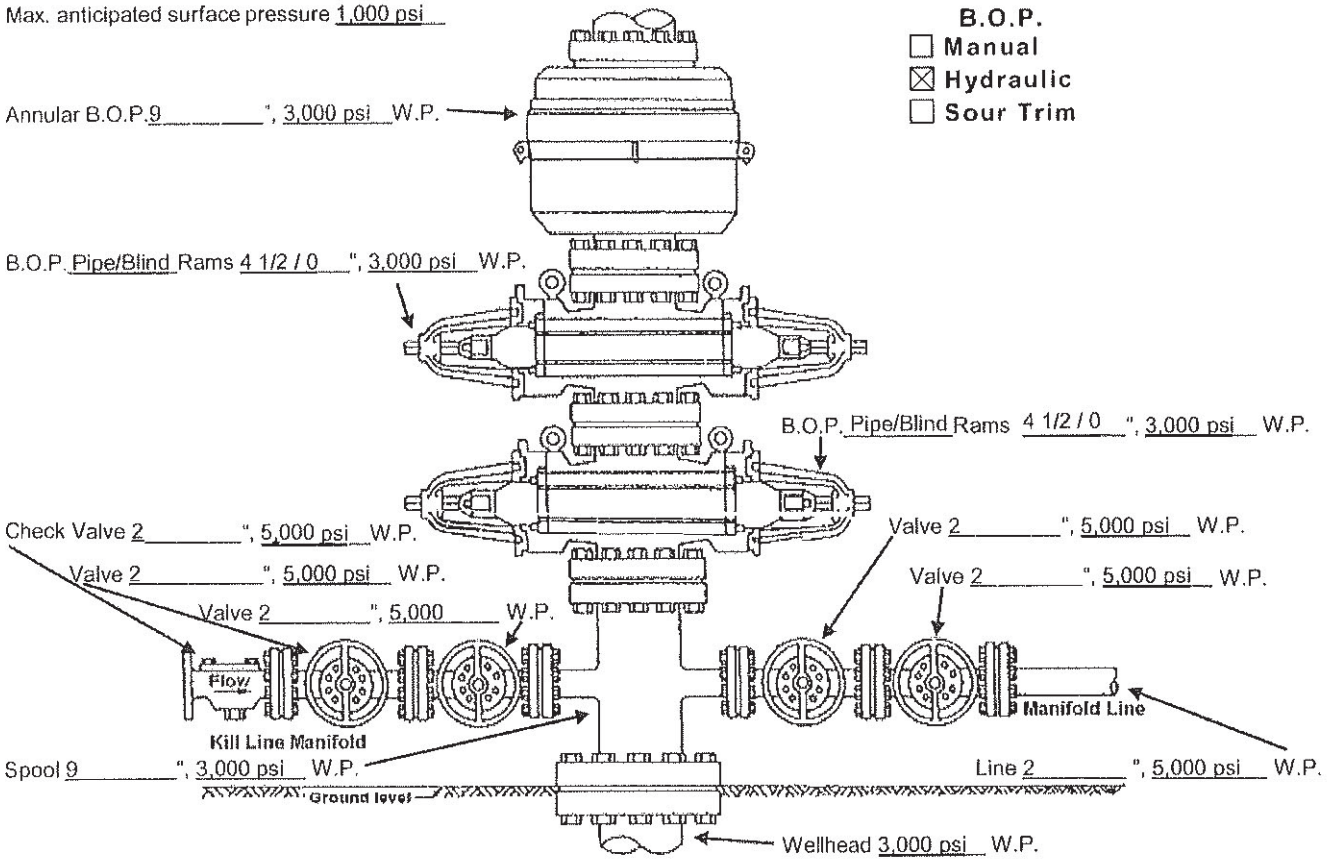
This information is required by authority of Part 615 Supervisor of Wells or Part 625 Mineral Wells, Act 451 PA 1994, as amended, in order to obtain a permit.

Applicant
Republic Services of Michigan I, LLC
Carleton Farms Landfill
28800 Clark Road
New Boston, MI 48164

Well name and number
IW#1-36N
IW#2-36E

Max. anticipated surface pressure 1,000 psi

B.O.P.
☐ Manual
☒ Hydraulic
☐ Sour Trim



Fill above blanks with applicable information. If not applicable, enter "N.A." or cross-out item shown.
Describe test pressures and procedure for conducting pressure test. Identify any exceptions to R324.406 being requested.

Standard pressure testing and verification of operation will be conducted before drilling out of casing.

Wellhead/casing design and tests to be conducted based on maximum casing/formation specifications of 3,000 psi BOP to be used for all shallow casing strings. Shoe tests to be conducted at below formation fracture pressures.

Standard pressure testing and verification will include: Nipple up BOP, choke lines and kill lines and test per API RP53 guidelines as follows: (1) Test annular to 300 psi for 20 minutes, then to a minimum of 2,100 psi for a minimum of 20 minutes with a joint of drill pipe installed, (2) test rams to 300 psi for 20 minutes, then to 3,000 psi for a minimum of 20 minutes, (3) test wellhead to 300 psi for 20 minutes, then to 3,000 psi for a minimum of 20 minutes, (4) test kill line, choke line, and choke manifold to 5,000 psi for a minimum of 20 minutes; do not test against manual chokes, and (5) verify pre-charge on accumulator.

No exceptions to R324.406 requested at this time.

A.6 Form EQP 7500-3, Environmental Impact Assessment for Mineral Wells Surface Facilities

The Environmental Impact Assessments for Mineral Wells and Surface Feature are presented in/on Form EQP 7500-3 for each well and are presented at the end of this Section (A.6). Also presented at the end of Section A.4 is a letter authorizing placement of the wells within 300 feet of a building as presented on Figures A.4-8a through A.4-8d.

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

ENVIRONMENTAL IMPACT ASSESSMENT FOR MINERAL WELLS AND SURFACE FACILITIES

To be submitted with an application for a well permit pursuant to Part 625, 1994 PA 451, as amended or prior to construction of associated surface facilities located more than 300 feet from the proposed well. Check all boxes and fill in all blanks that apply to the proposed well(s) or proposed surface facility.

This EIA is for (check one)

- [X] Well only. Complete Parts A, B, D, E, F, G, H, and I.
- [ ] Surface facility only (to be constructed more than 300 feet from the well). Complete Parts A1, A2, C, D, E, F, G, H, & I.
- [ ] Well and surface facility. Complete all Parts.

A. PROJECT DESCRIPTION

1. **Applicant** Republic Services, Carleton Farms Landfill

2. **Well name and number**
   IW#1-36N

3. **Well type**
   - [ ] Artificial brine production well
   - [ ] Natural brine production well
   - [ ] Test well greater than 250' deep or penetrating below deepest freshwater aquifer
   - [ ] Blanket test well(s) Number of proposed wells __ Anticipated maximum depth _____
   - [ ] Processed brine disposal well
   - [X] Single-source, non-commercial, waste disposal well
   - [ ] Multi-source commercial non-hazardous waste disposal well
   - [ ] Multi-source commercial hazardous waste disposal well
   - [ ] Storage well

4. [ ] **Yes** [X] **No** **Is this well a replacement for an existing well?**
   If Yes, list
   Existing well name and number
   Current owner
   Existing well type and status
   Existing well location
   Reason for replacement
   Disposition of existing well

5. [ ] **Yes** [X] **No** **Is this well a reentry of an existing well?**
   If Yes, list
   Existing well name and number
   Current owner
   Existing well type and status
   Reason for reentry

6. [ ] **Yes** [X] **No** **Is the well expected to encounter hydrogen sulfide (H_2S)?**
   If Yes, list formations expected to contain H_2S and anticipated depths to tops of formations

7. [X] **Yes** [ ] **No** **Is the well expected to encounter oil or gas?**
   If Yes, list formations expected to contain oil or gas and anticipated depths to tops of formations

   Possible minor oil or gas shows in Trenton Formation (2,365 ft. BGL)

8. [ ] **Yes** [X] **No** **Will the well be drilled from an existing drill pad?**
   If Yes, list well name, number, permit number and status of all existing wells on the drill pad (if no wells, write "none")

   Show proposed well and all existing wells on accompanying scale map identified as applying to Part A1 of the EIA.

B. DRILLSITE

1. Drill site access route dimensions 500 feet x 20 feet.
Provide a detailed description of topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use for the drill site access route. Show route on accompanying scale map labeled **Part B1**.

IW-1 (1-36) 500 ft. x 20 ft. Access off Arkona Road (gravel), as shown in Figure A.4-8a. Soil types Pe and Sfa occur in this area described as: Pewamo loam (0-2 percent slope) and Selfridge-Pewamo Complex, 0 to 3 percent slopes. The Pewamo series consists of poorly drained of very poorly drained level or nearly level soils on till plains, lake plains and moraines. The surface layer is a very dark gray loam to silky clay loam; underlying material at 36 inches is yellowish brown silty clay loam. Permeability is moderately slow and available water capacity is high. Runoff is very slow. Pewamo soils are suited to cropland and woodland. The Selfridge-Pewamo complex includes 50% Selfridge loamy sand, 30% Pewamo loam, and 20% other minor soils. This unit is suited to crops commonly grown in the county.

2. Drill site dimensions 200 feet x 200 feet.
Provide a detailed description of topography, drainage, soil types(s), direction and percentage of slopes, land cover and present land use for the drill site. Show well site on accompanying scale map labeled **Part B2**

IW-1 (1-36) 200 ft. x 200 ft. Well location shown in Figure A.4-8a. The soils in the well area were found to be remnant hydric soils with low chromas and redox features. The mapped soil unit is Pewamo clay loam (Pf) which is listed as a hydric soil. Due to the previous historical agricultural practice and subsequent landfill development, it is expected that this location will have a highly disturbed soil profile.

NOTE: If any "Yes" box in items B3, B4, B5, B6, B7 or B8 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to P art B of the EIA.

3. ☐ **Yes** ☒ **No** **Are drain tiles present on the drill site?**
If Yes, how they will be handled if they are encountered?

4. Are any of the following located within 600 feet of the proposed wellhead?
- ☒ Yes ☐ No Buildings
- ☐ Yes ☒ No Domestic fresh water wells - verified by field survey
- ☒ Yes ☐ No Public roads
- ☐ Yes ☒ No Railroads
- ☒ Yes ☐ No Power lines
- ☐ Yes ☒ No Pipelines
- ☒ Yes ☐ No Other man-made features (list individual features)

IW-1 (1-36): Monitoring wells, leachate tank, storage shed

5. Are any of the following located within 800 feet of the proposed wellhead?
☐ Yes ☒ No Type IIB public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIB have an average daily water production of less than 20,000 gallons per day)
☐ Yes ☒ No Type III public water wells (Type III is a public water supply which is neither Type I nor type II.)

6. Are any of the following located within 1320 feet of the proposed wellhead?
- ☒ Yes ☐ No Surface waters and other environmentally sensitive areas
- ☒ Yes ☐ No Floodplains associated with surface waters
- ☒ Yes ☐ No Wetlands, as identified by sections 30301 to 30323 of the Act.
- ☐ Yes ☒ No Natural rivers, as identified by sections 30501 to 30515 of the Act
- ☐ Yes ☒ No Threatened or endangered species as identified by sections 36501 to 36507 of the Act

7. Are any of the following located within 2000 feet of the proposed wellhead?
☐ Yes ☒ No Type I public water wells (Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.)
☐ Yes ☒ No Type IIA public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIA have an average daily water production of greater than 20,000 gallons per day)

8. ☐ **Yes** ☒ **No** **Are Great Lakes shorelines located within 1500 feet of the proposed wellhead?**

9. ☒ **Yes** ☐ **No** **Will fresh water be used to drill this well?**
If Yes, will the water be supplied from
- ☐ A "permanent" water well, to be retained after final completion OR used for drinking water (to be drilled and installed pursuant to Part 127 of 1979 PA 368, as amended) **OR**
- ☐ A "temporary" water well, to be plugged upon final completion and not used for drinking water **OR**
- ☒ Another source (identify) Trucked from offsite source.

If No, identify the drilling fluid to be used.

10. Drilling fluid pit location and handling and disposal of drill cuttings, muds and fluids

Anticipated depth to groundwater aprox 20' Depth determined by nearby monitoring well data and occurrence of nearby wetland

Pit type

☐ On site in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Show proposed pit location on accompanying scale map labeled **Part B10**.

☐ Remote in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Attach approval of landowner and show remote pit location on accompanying scale map labeled **Part B10**.

☒ On-site steel tanks with no in-ground pits (complete 10a and 10d below, do not complete 10b and 10c)

a. ☒ **Yes** ☐ **No Will the well be drilled into or through bedded salt deposits?**

If Yes,

☐ Yes ☒ No Will the drill cuttings contain solid salt?

If Yes, describe plans for handling and disposing of drill cuttings.

Minor salt may be encountered during drilling. All cuttings will be collected and disposed.

b. ☐ **Yes** ☐ **No Will the drilling fluid pit contents be solidified after drilling?**

If Yes, identify the pit solidification contractor and pit solidification method.

c. ☐ **Yes** ☐ **No Will the drilling fluid pit contents be removed after drilling?**

If Yes, identify the site for disposal of the removed material.

d. ☒ **Yes** ☐ **No Will any pit fluid be disposed by a licensed liquid waste hauler?**

If Yes, identify the waste hauler.

Tanked waste will be disposed of at Northern A-1 or suitable equivalent.

If No, describe disposal plans for pit fluids.

C. SURFACE FACILITY

1. ☒ **Yes** ☐ **No Will the well have associated surface facilities?**

If No, Do not complete the remainder of Part C.

If Yes,

☐ **Yes** ☒ **No Does a surface facility currently exist?**

If Yes, show facility location relative to the wellhead on a scale map labeled Part C1. Do not complete the remainder of Part C.

If No,

☐ **Yes** ☒ **No Has a location for the surface facility been chosen?**

If Yes, complete Parts C2 through C10.

If No, at least 60 days prior to beginning construction, submit an EIA for the Surface Facility (this form), a facility plan, and a Soil Erosion and Sedimentation Control Plan (EQP 7200-18) to the Oil, Gas, and Minerals Division District Supervisor.

2. ☐ **Yes** ☐ **No Is the proposed surface facility site more than 300 feet from the wellhead?**

If Yes, complete Parts C3 through c10 and submit a map showing the location of the surface facility site relative to the wellhead.

If No, do not complete the remainder of Part C.

3. **Dimensions of surface facility access road:** ___feet x ___feet.
Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

4. **Dimensions of surface facility site:** ___feet x ___feet.
Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

NOTE: If any "Yes" box in items C5, C6, C7, C8, C9, or C10 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to the appropriat e section of Part C of the EIA.

5. ☐ **Yes** ☐ **No** **Are drain tiles present on the proposed surface facility site?**
If Yes, discuss how they will be handled if they are encountered?

6. **Are any of the following located within 600 feet of the proposed surface facility site?**
☐ Yes ☐ No Buildings
☐ Yes ☐ No Domestic fresh water wells
☐ Yes ☐ No Public roads
☐ Yes ☐ No Railroads
☐ Yes ☐ No Power lines
☐ Yes ☐ No Pipelines
☐ Yes ☐ No Other man-made features (list individual features)

7. **Are any of the following located within 800 feet of the proposed surface facility site?**
☐ Yes ☐ No Type IIB public water wells. (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIB have an average daily water production of less than 20,000 gallons per day)
☐ Yes ☐ No Type III public water wells. (Type III is a public water supply which is neither Type I nor type II.)

8. **Are any of the following located within 1320 feet of the proposed surface facility site?**
☐ Yes ☐ No Surface waters and other environmentally sensitive areas
☐ Yes ☐ No Floodplains associated with surface waters
☐ Yes ☐ No Wetlands, as identified by sections 30301 to 30323 of the Act.
☐ Yes ☐ No Natural rivers, as identified by sections 30501 to 30515 of the Act
☐ Yes ☐ No Threatened or endangered species as identified by sections 36501 to 36507 of the Act

9. **Are any of the following located within 2000 feet of the proposed surface facility site?**
☐ Yes ☐ No Type I public water wells. (Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.)
☐ Yes ☐ No Type IIA public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIA have an average daily water production of greater than 20,000 gallons per day).

10. ☐ Yes ☐ No **Are Great Lakes shorelines located within 1500 feet of the proposed surface facility site?**

D. FLOWLINE

☐ **Yes** ☒ **No** **Will the well have an associated flow line?**

If Yes,

Flow line rout dimensions _____ feet x _____

Show flow line route from well to the surface facility, junction with an existing flowline or gathering system, on a scale map labeled **Part C2.**

Anticipated maximum operating pressure (psig): _____

Describe leak detection program, including schedules of periodic pressure testing and periodic flowline patrols.

Flow line material: _____

Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use along the flow line route.

☐ **Yes** ☐ **No** **Will the flowline be buried?**

If Yes

Burial depth: _____ feet

Describe flowline route marking scheme.

If No, describe measures to protect flowline from vehicular damage.

E. MITIGATION OF IMPACTS FROM DRILLING AND/OR PRODUCTION

Describe additional measures to be taken to protect environmental and/or land use values

A minimal amount of earthwork will be necessary to construct the access drive and drilling pad. Topsoil will be stockpiled and replaced as conditions permit. There should be little impact on residents, public utilities, or land or water use in the area. Land values should not be adversely affected by drilling and well operations.

F. ADDITIONAL PERMITS

Identify additional permits to be sought USEPA UIC Permit

G. SOIL EROSION AND SEDIMENTATION PLAN

Submit a soil erosion and sedimentation plan (form EQP 7200-18) which addresses **each** well site, surface facility, and flow line route identified in this application. (Refer to requirements under Part 91, 1994 PA 451)

H. ALTERNATE WELL AND SURFACE FACILITY LOCATIONS

Were alternate surface locations considered for this well or surface facility?

☒ No, alternate sites did not seem necessary or more desirable

☐ Yes, the following locations were considered

Why were they rejected in favor of the proposed location?

I. CERTIFICATION

"I state that I am authorized by said applicant to prepare this document. It was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Brent Goodsell, Area President		1/18/2021
Name and title (printed or typed)	Authorized Signature	Date

Enclose with *Application For Permit To Drill*

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

ENVIRONMENTAL IMPACT ASSESSMENT FOR MINERAL WELLS AND SURFACE FACILITIES

To be submitted with an application for a well permit pursuant to Part 625, 1994 PA 451, as amended or prior to construction of associated surface facilities located more than 300 feet from the proposed well. Check all boxes and fill in all blanks that apply to the proposed well(s) or proposed surface facility.

This EIA is for (check one)

- [X] Well only. Complete Parts A, B, D, E, F, G, H, and I.
- [ ] Surface facility only (to be constructed more than 300 feet from the well). Complete Parts A1, A2, C, D, E, F, G, H, & I.
- [ ] Well and surface facility. Complete all Parts.

A. PROJECT DESCRIPTION

1. Applicant Republic Services, Carleton Farms Landfill

2. Well name and number
IW#2-36E

3. Well type

- [ ] Artificial brine production well
- [ ] Natural brine production well
- [ ] Test well greater than 250' deep or penetrating below deepest freshwater aquifer
- [ ] Blanket test well(s) Number of proposed wells __ Anticipated maximum depth _____
- [ ] Processed brine disposal well
- [X] Single-source, non-commercial, waste disposal well
- [ ] Multi-source commercial non-hazardous waste disposal well
- [ ] Multi-source commercial hazardous waste disposal well
- [ ] Storage well

4. [ ] **Yes** [X] **No** **Is this well a replacement for an existing well?**
If Yes, list
Existing well name and number
Current owner
Existing well type and status
Existing well location
Reason for replacement
Disposition of existing well

5. [ ] **Yes** [X] **No** **Is this well a reentry of an existing well?**
If Yes, list
Existing well name and number
Current owner
Existing well type and status
Reason for reentry

6. [ ] **Yes** [X] **No** **Is the well expected to encounter hydrogen sulfide (H_2S)?**
If Yes, list formations expected to contain H_2S and anticipated depths to tops of formations

7. [X] **Yes** [ ] **No** **Is the well expected to encounter oil or gas?**
If Yes, list formations expected to contain oil or gas and anticipated depths to tops of formations

Possible minor oil or gas shows in Trenton Formation (2,365 ft. BGL)

8. [ ] **Yes** [X] **No** **Will the well be drilled from an existing drill pad?**
If Yes, list well name, number, permit number and status of all existing wells on the drill pad (if no wells, write "none")

Show proposed well and all existing wells on accompanying scale map identified as applying to Part A1 of the EIA.

B. DRILLSITE

1. Drill site access route dimensions ---- feet x ---- feet. (Using pre-existing road.)
Provide a detailed description of topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use for the drill site access route. Show route on accompanying scale map labeled **Part B1**.

IW-2 (2-36) access off Clark, as shown in Figure A.4-8b. Soil type Pe occurs in this area described as Pewamo loam (0-2 percent slope). The Pewamo series consists of poorly drained of very poorly drained level or nearly level soils on till plains, lake plains and moraines. The surface layer is a very dark gray loam to silky clay loam; underlying material at 36 inches is yellowish brown silty clay loam. Permeability is moderately slow and available water capacity is high. Runoff is very slow. Pewamo soils are suited to cropland and woodland.

2. Drill site dimensions 200 feet x 200 feet.
Provide a detailed description of topography, drainage, soil types(s), direction and percentage of slopes, land cover and present land use for the drill site. Show well site on accompanying scale map labeled **Part B2**

IW-2 (2-36) 200 ft. x 200 ft. Well location shown in Figure A.4-8b. The soils were found to be remnant hydric soils with low chromas and redox features. The hydric soil indicator Depleted Below Dark Surface was identified within the soil pit. The mapped soil unit is Pewamo clay loam (Pf) which is listed as a hydric soil.

NOTE: If any "Yes" box in items B3, B4, B5, B6, B7 or B8 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to Part B of the EIA.

3. ☐ **Yes** ☒ **No** **Are drain tiles present on the drill site?**
If Yes, how they will be handled if they are encountered?

4. Are any of the following located within 600 feet of the proposed wellhead?

☒ Yes	☐ No	Buildings
☐ Yes	☒ No	Domestic fresh water wells
☒ Yes	☐ No	Public roads
☐ Yes	☒ No	Railroads
☐ Yes	☒ No	Power lines
☐ Yes	☒ No	Pipelines
☒ Yes	☐ No	Other man-made features (list individual features)

IW-2 (2-36): Monitoring wells, condensate wells, hydrant and air valve, two tanks, storage shed

5. Are any of the following located within 800 feet of the proposed wellhead?
☐ Yes ☒ No Type IIB public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIB have an average daily water production of less than 20,000 gallons per day)
☐ Yes ☒ No Type III public water wells (Type III is a public water supply which is neither Type I nor type II.)

6. Are any of the following located within 1320 feet of the proposed wellhead?

☒ Yes	☐ No	Surface waters and other environmentally sensitive areas
☐ Yes	☒ No	Floodplains associated with surface waters
☒ Yes	☐ No	Wetlands, as identified by sections 30301 to 30323 of the Act.
☐ Yes	☒ No	Natural rivers, as identified by sections 30501 to 30515 of the Act
☐ Yes	☒ No	Threatened or endangered species as identified by sections 36501 to 36507 of the Act

7. Are any of the following located within 2000 feet of the proposed wellhead?
☐ Yes ☒ No Type I public water wells (Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.)
☐ Yes ☒ No Type IIA public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIA have an average daily water production of greater than 20,000 gallons per day)

8. ☐ **Yes** ☒ **No** **Are Great Lakes shorelines located within 1500 feet of the proposed wellhead?**

9. ☒ **Yes** ☐ **No** **Will fresh water be used to drill this well?**
If Yes, will the water be supplied from
☐ A "permanent" water well, to be retained after final completion OR used for drinking water (to be drilled and installed pursuant to Part 127 of 1979 PA 368, as amended) **OR**
☐ A "temporary" water well, to be plugged upon final completion and not used for drinking water **OR**
☒ Another source (identify) Trucked from offsite source.
If No, identify the drilling fluid to be used.

10. Drilling fluid pit location and handling and disposal of drill cuttings, muds and fluids

Anticipated depth to groundwater 20' Depth determined by nearby monitoring well data.

Pit type

☐ On site in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Show proposed pit location on accompanying scale map labeled **Part B10**.

☐ Remote in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Attach approval of landowner and show remote pit location on accompanying scale map labeled **Part B10**.

☒ On-site steel tanks with no in-ground pits (complete 10a and 10d below, do not complete 10b and 10c)

a. ☒ **Yes** ☐ **No Will the well be drilled into or through bedded salt deposits?**

If Yes,

☐ Yes ☒ No Will the drill cuttings contain solid salt?

If Yes, describe plans for handling and disposing of drill cuttings.

Minor salt may be encountered during drilling. All cuttings will be collected and disposed.

b. ☐ **Yes** ☐ **No Will the drilling fluid pit contents be solidified after drilling?**

If Yes, identify the pit solidification contractor and pit solidification method.

c. ☐ **Yes** ☐ **No Will the drilling fluid pit contents be removed after drilling?**

If Yes, identify the site for disposal of the removed material.

d. ☒ **Yes** ☐ **No Will any pit fluid be disposed by a licensed liquid waste hauler?**

If Yes, identify the waste hauler.

Tanked waste will be disposed at Northern A-1 or other suitable equivalent.

If No, describe disposal plans for pit fluids.

C. SURFACE FACILITY

1. ☒ **Yes** ☐ **No Will the well have associated surface facilities?**

If No, Do not complete the remainder of Part C.

If Yes,

☐ **Yes** ☒ **No Does a surface facility currently exist?**

If Yes, show facility location relative to the wellhead on a scale map labeled Part C1. Do not complete the remainder of Part C.

If No,

☐ **Yes** ☒ **No Has a location for the surface facility been chosen?**

If Yes, complete Parts C2 through C10

If No, at least 60 days prior to beginning construction, submit an EIA for the Surface Facility (this form), a facility plan, and a Soil Erosion and Sedimentation Control Plan (EQP 7200-18) to the Oil, Gas, and Minerals Division District Supervisor.

2. ☐ **Yes** ☐ **No Is the proposed surface facility site more than 300 feet from the wellhead?**

If Yes, complete Parts C3 through c10 and submit a map showing the location of the surface facility site relative to the wellhead.

If No, do not complete the remainder of Part C.

3. **Dimensions of surface facility access road:** ___feet x ___feet.
Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

4. **Dimensions of surface facility site:** ___feet x ___feet.
Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

NOTE: If any "Yes" box in items C5, C6, C7, C8, C9, or C10 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to the appropriat e section of Part C of the EIA.

5. ☐ **Yes** ☐ **No** **Are drain tiles present on the proposed surface facility site?**
If Yes, discuss how they will be handled if they are encountered?

6. **Are any of the following located within 600 feet of the proposed surface facility site?**
☐ Yes ☐ No Buildings
☐ Yes ☐ No Domestic fresh water wells
☐ Yes ☐ No Public roads
☐ Yes ☐ No Railroads
☐ Yes ☐ No Power lines
☐ Yes ☐ No Pipelines
☐ Yes ☐ No Other man-made features (list individual features)

7. **Are any of the following located within 800 feet of the proposed surface facility site?**
☐ Yes ☐ No Type IIB public water wells. (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIB have an average daily water production of less than 20,000 gallons per day)
☐ Yes ☐ No Type III public water wells. (Type III is a public water supply which is neither Type I nor type II.)

8. **Are any of the following located within 1320 feet of the proposed surface facility site?**
☐ Yes ☐ No Surface waters and other environmentally sensitive areas
☐ Yes ☐ No Floodplains associated with surface waters
☐ Yes ☐ No Wetlands, as identified by sections 30301 to 30323 of the Act.
☐ Yes ☐ No Natural rivers, as identified by sections 30501 to 30515 of the Act
☐ Yes ☐ No Threatened or endangered species as identified by sections 36501 to 36507 of the Act

9. **Are any of the following located within 2000 feet of the proposed surface facility site?**
☐ Yes ☐ No Type I public water wells. (Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.)
☐ Yes ☐ No Type IIA public water wells (Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year. Type IIA have an average daily water production of greater than 20,000 gallons per day).

10. ☐ Yes ☐ No **Are Great Lakes shorelines located within 1500 feet of the proposed surface facility site?**

D. FLOWLINE

☐ **Yes** ☒ **No** **Will the well have an associated flow line?**

If Yes,

Flow line rout dimensions _____ feet x _____

Show flow line route from well to the surface facility, junction with an existing flowline or gathering system, on a scale map labeled **Part C2.**

Anticipated maximum operating pressure (psig): _____

Describe leak detection program, including schedules of periodic pressure testing and periodic flowline patrols.

Flow line material: _____

Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use along the flow line route.

☐ **Yes** ☐ **No** **Will the flowline be buried?**

If Yes

Burial depth: _____ feet

Describe flowline route marking scheme.

If No, describe measures to protect flowline from vehicular damage.

E. MITIGATION OF IMPACTS FROM DRILLING AND/OR PRODUCTION

Describe additional measures to be taken to protect environmental and/or land use values

A minimal amount of earthwork will be necessary to construct the access drive and drilling pad. Topsoil will be stockpiled and replaced as conditions permit. There should be little impact on residents, public utilities, or land or water use in the area. Land values should not be adversely affected by drilling and well operations.

F. ADDITIONAL PERMITS

Identify additional permits to be sought USEPA UIC Permit

G. SOIL EROSION AND SEDIMENTATION PLAN

Submit a soil erosion and sedimentation plan (form EQP 7200-18) which addresses **each** well site, surface facility, and flow line route identified in this application. (Refer to requirements under Part 91, 1994 PA 451)

H. ALTERNATE WELL AND SURFACE FACILITY LOCATIONS

Were alternate surface locations considered for this well or surface facility?

☒ No, alternate sites did not seem necessary or more desirable

☐ Yes, the following locations were considered

Why were they rejected in favor of the proposed location?

I. CERTIFICATION

"I state that I am authorized by said applicant to prepare this document. It was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Brent Goodsell, Area President		1/18/2021
Name and title (printed or typed)	Authorized Signature	Date

Enclose with *Application For Permit To Drill*

A.7 Form EQP 7200-18, Soil Erosion and Sedimentation Control Plan

The Soil Erosion and Sediment Control Plan is presented on Form EQP 7200-18, presented at the end of this Section (A.7). A completed form for each of the two proposed well locations is provided at the end of Section A.7. A copy of the cover letter addressed to the County CEA notifying provision of soil erosion and sedimentation control plans is also provided at the end of Section A.7

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY – OIL, GAS, AND MINERALS DIVISION

SOIL EROSION & SEDIMENTATION CONTROL PLAN

By authority of Part 91, and Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment. Applicants for multisource commercial hazardous waste disposal wells under Part 625 are required to obtain a Part 91 permit from a county or local enforcing agency

☐ Part 615 Oil/Gas Well ☒ Part 625 Mineral Well

1. Name and address of applicant
Republic Services of Michigan, LLC
Carleton Farms Landfill
28800 Clark Road
New Boston, MI 48164
Phone: (734) 654-3615 Fax: ( )

2. Well or project name:
Carleton Farms Landfill Well IW#1-36N

3. Well or project location:
Section(s) 36 T 4S R 8E

4. Name and address of County or local Enforcement Agent (CEA)
Patrick Cullen, Division Director, Environmental Services
Deputy Drain Commissioner
Wayne County Department of Environment-CEA 3600
Commerce Court Bldg, Wayne MI 48184
Phone: (734) 326-4437 Fax: (734) 326-4421

5. Township
Sumpter

6. County
Wayne

7. Date earth changes expected to start
2020

8. Date of expected completion
2020

9. Name and address of person responsible for earth change:
Brant Daniel
110 South Third Street, Suite 202
St. Claire, Michigan
Phone: (810) 956-2181 Fax: ( )

10. Name and address of person responsible for maintenance:
Brant Daniel
110 South Third Street, Suite 202
St. Claire, Michigan
Phone: (810) 956-2181 Fax: ( )

11. Send copies of supplemental plat required by Part 615, R 324.201(2)(b) or R 324.504(4), and this form and all attachments, to CEA. For Part 625 Mineral Wells, send to CEA only as instructed by OGMD staff.
Date sent to CEA as instructed by OGMD staff, sent to CEA on 5/5/2020 (PB)

EARTH CHANGE ACTIVITIES

12. Project description: (Project activities may be permitted sequentially.)
a. Number of well sites 1 , 0.92 acres
b. Number of surface facility sites 1 , TBD acres
c. New access roads 500 feet, 0.23 acres
d. Flow line(s) trenched in off well site* N/A feet, _____ acres
e. Flow line(s) plowed in off well site* N/A feet, _____ acres
*Contact CEA for fee schedule

13. Describe sites for which permits are being sought under Part 301 (Inland Lakes & Streams) None
Describe sites for which permits are being sought under Part 303 (Wetlands) None
List file numbers if known

14. Attach detail map at scale of 1"=200' or larger, with contour lines at a minimum of 20' intervals OR percent slope descriptions. See Figure A.4-4

15. Areas requiring control structures
Will earth changes occur in areas with slopes of 10% or greater; areas where runoff water is likely, such as runs greater than 500' of moderate slope (5% to 10%), narrow valley bottoms, etc.; areas within 500' of a lake or stream; or other areas where sedimentation to a wetland or drainage way may occur?
☒ Yes ☐ No

Indicate any of the following erosion control structures that will be utilized. Identify location on detail map and attach detail plan.
Indicate on plan whether erosion control structures are temporary or permanent.
☐ Diversions ☐ Culverts ☐ Sediment basins ☒ Silt fences ☐ Rip-rap ☒ Berms ☐ Check dams
☐ Other

16. Site restoration
☒ Topsoil will be segregated from subsoil and stockpiled OR ☐ No topsoil on site
☒ Recontour and revegetate as soon as weather permits. Seed mix Michigan DNR mix or owner preference
☐ Describe other proposed methods of restoration

17. Application prepared by (name)
Brent Goodsell, Area President
Signature
Date 5-4-20

FOR USE OF COUNTY OR LOCAL ENFORCING AGENT

INSTRUCTIONS TO COUNTY OR LOCAL ENFORCMENT AGENT: Copies of supplemental plat required by Part 615, R324.201(2)(b) or R324.504(4), and this form and all attachments are provided for CEA review and informational purposes only. For activities issued under Part 615, local permitting for SESC is not necessary; OGMD staff will evaluate and enforce SESC measures (SEE R324.9115 (3) of Part 91, Soil Erosion and Sedimentation Control, NREPA, PA 451 of 1994). Submittal to CEA is not a requirement under Part 615 or 625. Part 615 and 625 Permits to Drill and Operate include erosion control plan approval for well sites, access roads, flow lines, and surface facilities. Return this form to the applicable field or district office of the Oil, Gas, and Minerals Division (OGMD) within 30 days of receipt. OGMD will consider all comments and recommendations in reviewing the application.

17. Comments

☐ Conducted on-site inspection Date _____ ☐ Inspected site with representative of applicant Date _____

CEA (name) _____ Date _____

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY – OIL, GAS, AND MINERALS DIVISION

SOIL EROSION & SEDIMENTATION CONTROL PLAN

By authority of Part 91, and Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment. Applicants for multisource commercial hazardous waste disposal wells under Part 625 are required to obtain a Part 91 permit from a county or local enforcing agency

☐ Part 615 Oil/Gas Well ☒ Part 625 Mineral Well

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Republic Services of Michigan, LLC
Carleton Farms Landfill
28800 Clark Road
New Boston, MI 48164
Phone: (734) 654-3615 Fax: ( )

2. Well or project name:
Carleton Farms Landfill Well IW#2-36E

3. Well or project location:
Section(s) 36 T 4S R 8E

4. Name and address of County or local Enforcement Agent (CEA)
Patrick Cullen, Division Director. Environmental Services
Deputy Drain Commissioner
Wayne County Department of Environment-CEA 3600
Commerce Court Bldg, Wayne MI 48184
Phone: (734) 326-4437 Fax: (734) 326-4421

5. Township
Sumpter

6. County
Wayne

7. Date earth changes expected to start
2020

8. Date of expected completion
2020

9. Name and address of person responsible for earth change:
Brant Daniel
110 South Third Street, Suite 202
St. Claire, Michigan
Phone: (810) 956-2181 Fax: ( )

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Brant Daniel
110 South Third Street, Suite 202
St. Claire, Michigan
Phone: (810) 956-2181 Fax: ( )

11. Send copies of supplemental plat required by Part 615, R 324.201(2)(b) or R 324.504(4), and this form and all attachments, to CEA. For Part 625 Mineral Wells, send to CEA only as instructed by OGMD staff.
Date sent to CEA as instructed by OGMD staff, sent to CEA on 5/5/2020. (PB)

EARTH CHANGE ACTIVITIES

12. Project description: (Project activities may be permitted sequentially.)
a. Number of well sites 1, 0.92 acres
b. Number of surface facility sites 1, TBD acres
c. New access roads 0 feet, N/A acres
d. Flow line(s) trenched in off well site* N/A feet, _____ acres
e. Flow line(s) plowed in off well site* N/A feet, _____ acres
*Contact CEA for fee schedule

13. Describe sites for which permits are being sought under Part 301 (Inland Lakes & Streams) None
Describe sites for which permits are being sought under Part 303 (Wetlands) None
List file numbers if known

14. Attach detail map at scale of 1"=200' or larger, with contour lines at a minimum of 20' intervals OR percent slope descriptions. See Figure A.4-4

15. Areas requiring control structures
Will earth changes occur in areas with slopes of 10% or greater; areas where runoff water is likely, such as runs greater than 500' of moderate slope (5% to 10%), narrow valley bottoms, etc.; areas within 500' of a lake or stream; or other areas where sedimentation to a wetland or drainage way may occur?
☒ Yes ☐ No

Indicate any of the following erosion control structures that will be utilized. Identify location on detail map and attach detail plan.
Indicate on plan whether erosion control structures are temporary or permanent.
☐ Diversions ☐ Culverts ☐ Sediment basins ☒ Silt fences ☐ Rip-rap ☒ Berms ☐ Check dams
☐ Other

16. Site restoration
☒ Topsoil will be segregated from subsoil and stockpiled OR ☐ No topsoil on site
☒ Recontour and revegetate as soon as weather permits. Seed mix Michigan DNR mix or owner preference
☐ Describe other proposed methods of restoration

17. Application prepared by (name)
Brent Goodsell, Area President
Signature
Date 5-4-20

FOR USE OF COUNTY OR LOCAL ENFORCING AGENT

INSTRUCTIONS TO COUNTY OR LOCAL ENFORCMENT AGENT: Copies of supplemental plat required by Part 615, R324.201(2)(b) or R324.504(4), and this form and all attachments are provided for CEA review and informational purposes only. For activities issued under Part 615, local permitting for SESC is not necessary; OGMD staff will evaluate and enforce SESC measures (SEE R324.9115 (3) of Part 91, Soil Erosion and Sedimentation Control, NREPA, PA 451 of 1994). Submittal to CEA is not a requirement under Part 615 or 625. Part 615 and 625 Permits to Drill and Operate include erosion control plan approval for well sites, access roads, flow lines, and surface facilities. Return this form to the applicable field or district office of the Oil, Gas, and Minerals Division (OGMD) within 30 days of receipt. OGMD will consider all comments and recommendations in reviewing the application.

17. Comments

☐ Conducted on-site inspection Date _____ ☐ Inspected site with representative of applicant Date _____

CEA (name) _____ Date _____

REPUBLIC SERVICES

28800 Clark Road. , New Boston, MI 48164
o 734.271.6142 f 734.654.7231 republicservices.com

May 5, 2020

Sent via Federal Express No.:7703 9367 6881

Mr. Patrick Cullen,
Division Director, Environmental Services
Deputy Drain Commissioner
Wayne County Department of Public Services -CEA
3600 Commerce Court Building E
Wayne, MI 48184

RE: Soil Erosion and Sedimentation Control Plans for Carleton Farms, Form EQP 7200-18

Dear Mr. Cullen:

Attached please find copies of the Soil Erosion and Sedimentation Control Plans (Form EQP 7200-18) for two proposed mineral wells to be installed within the property boundary of the Carleton Farms Landfill. A 625 Mineral Well application that includes both wells and these forms is currently being reviewed by the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

Should you have any questions, please contact me at cpearse@republicservices.com or 734-231-8217.

Sincerely,

REPUBLIC SERVICES OF MICHIGAN I, LLC

Christina L. Pearse

Environmental Manager

A.8 Provide a conformance bond. For information regarding bonding options see the link to mineral well bonds at http://www.michigan.gov/deqogs and click on Mineral Wells or contact Joe Petit at 517-284-6837.

Carleton Farms Landfill has a Surety Bond dated September 27, 2019 on file with the EGLE as a demonstration that sufficient financial assurance is available to manage well abandonment. The bonds are provided as an attachment at the end of Section A.8.

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

BOND FOR CONFORMANCE

By authority of Part 625, Mineral Wells, Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

MINERAL WELL OPERATIONS BOND	
Bond number	Well name and number
880309	Carleton Farms Landfill - Well IW#1-36N

Part 625 Bond Amounts		
Individual test well permit	Blanket test well permit	Disposal, storage, or brine well
☐ $5,500.00 for a depth of 0 to 1000'	☐ $5,500.00 for 1 to 24 wells	☐ $33,000.00 for a single well
☐ $11,000.00 for a depth greater than 1000' to 2000'	☐ $11,000.00 for 25 to 49 wells	Disposal, storage, brine, and individual test well
☐ $22,000.00 for a depth greater than 2000' to 4000'	☐ $16,500.00 for 50 to 75 wells	
☐ $33,000.00 for a depth greater than 4000'	☐ $22,000.00 for 76 to 200 wells	☐ $440,000.00 for blanket coverage

Republic Services of Michigan I, LLC
2880 Clark Road
New Boston, MI 48164
(Name and Address of Principal)

in the State of Michigan as Principal and

Evergreen National Indemnity Company
6140 Parkland Blvd, Suite 321
Mayfield Heights, OH 44124
(Name and Address of Surety)

a corporation organized and existing under the laws of the State of Ohio and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto the State of Michigan in the penal sum of

One Hundred Twenty One Thousand and 00/100 Dollars.

The Principal named is about to commence and prosecute to final completion well(s) authorized by permits issued or to be issued under Part 625, Act 451 PA 1994, as amended.

"Final completion" means either of the following: (1) The time when locating, drilling, deepening, converting, operating, producing, reworking, plugging, and proper site restoration have been performed on a well in a manner approved by the supervisor of mineral wells, including the filing of the mandatory records; (2) The time when a permit has been issued to convert an existing well subject to this part to a purpose allowed under another act or another part of the act.

When the Principal complies with the provisions of Part 625, Act 451 PA 1994, as amended, in the final completion of the well(s), the Surety's obligations can be terminated otherwise this obligation remains in full force and effect. The Surety's liability herein is co-extensive with that of the Principal and the State of Michigan has the same remedies against the Surety as against the Principal.

The Surety, by execution of the bond, accepts the liability covered by prior bond(s) _____

_____
(number(s) and company)

and gives notice to the Supervisor of Mineral Wells of the need for terminating the prior bond(s) as listed herein with such termination to be effective as of the time that this bond becomes effective.

Signed, sealed and dated the 27th day of September, 2019.

Republic Services of Michigan I, LLC
(Principal)

By _____
(Signature)

Amber Engel, Attorney-in-Fact
(Name and title)

Evergreen National Indemnity Company
(Surety)

By _____
(Signature)

Timothy S. Buhite, Attorney-in-Fact
(Name and title)

When the Principal or Surety executes this bond by an agent, power of attorney or other evidence of authority must accompany the bond.

DEQ USE ONLY	
Permit number	Issue date
Type of well	

MAIL TO:
OIL, GAS, AND MINERALS DIVISION
MICHIGAN DEPT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
P.O. BOX 30256
LANSING, MI 48909-7756

EQP 7200-03MW (rev. 5/2019)

POWER OF ATTORNEY

Republic Services, Inc., a Delaware corporation having its principal place of business at 18500 N. Allied Way, Phoenix, Arizona 85054, hereby makes, constitutes and appoints USI INSURANCE SERVICES NATIONAL, INC., acting through and by any one of Debbie Lindstrom, John Drummey, Jr., Timothy S. Buhite, Kathleen M. Mitchell, Scott C. Alderman, Peggy A. Firth, Brandi Heinbaugh, Amber Engel, Jamie Stroh, Holly E. Ulfers, Katie Snider, or Roxana Palacios its true and lawful attorney to sign and seal any and all surety bonds, bid bonds, performance bonds and payment bonds at or below the monetary threshold of Five Million Dollars ($5,000,000.00) on behalf of REPUBLIC SERVICES, INC. and its subsidiaries, relating to the provision of solid waste collection, transportation, transfer, recycling, disposal and/or energy services by REPUBLIC SERVICES, INC. and its subsidiaries and affix its corporate seal to and deliver for and on behalf as surety thereon or otherwise, bonds of any of the following classes, to wit:

1. Surety bonds, bid bonds, performance bonds and payment bonds to the United States of America or agency thereof, including those required or permitted under the laws or regulations relating to Customs or Internal Revenue; license and permit bonds or other indemnity bonds under the laws, ordinances or regulations of any state, city, town, village, board, other body organization, public or private; bonds to transportation companies; lost instrument bonds; lease bonds; worker's compensation bonds; miscellaneous surety bonds; and bonds on behalf of notaries public; sheriffs, deputy sheriffs and similar public officials.

2. Surety bonds, bid bonds performance bonds and payment bonds on behalf of REPUBLIC SERVICES, INC. and its subsidiaries in connection with bids, proposals or contracts.

REPUBLIC SERVICES, INC. hereby agrees to ratify and confirm whatsoever USI INSURANCE SERVICES NATIONAL, INC. shall lawfully do pursuant to this power of attorney, and until notice or revocation has been given by REPUBLIC SERVICES, INC., the acts of said attorney shall be binding on the undersigned.

IN WITNESS WHEREOF, this Power of Attorney has been signed this, 2 day of January 2019 on behalf of REPUBLIC SERVICES, INC. by its Assistant Secretary Eileen B. Schuler.

REPUBLIC SERVICES, INC.,
a Delaware Corporation

Eileen B. Schuler

STATE OF ARIZONA

COUNTY OF MARICOPA

Subscribed and sworn to before me this 2nd day of JANUARY, 2019 by Eileen B. Schuler, Assistant Secretary.

OFFICIAL SEAL
MATTHEW NORDQUIST
Notary Public - Arizona
MARICOPA COUNTY
My Commission Expires
MAY 31, 2019

Notary Public

EVERGREEN NATIONAL INDEMNITY COMPANY
MAYFIELD HEIGHTS, OH
POWER OF ATTORNEY

POWER NO. 880309

KNOW ALL MEN BY THESE PRESENTS: That the Evergreen National Indemnity Company, a corporation in the State of Ohio does hereby nominate, constitute and appoint:

Timothy S. Buhite

its true and lawful Attorney(s)-In-Fact to make, execute, attest, seal and deliver for and on its behalf, as Surety, and as its act and deed, where required, any and all bonds, undertakings, recognizances and written obligations in the nature thereof, PROVIDED, however, that the obligation of the Company under this Power of Attorney shall not exceed Fifteen Million Dollars and 00/100 ($15,000,000.00)

This Power of Attorney is granted and is signed by facsimile pursuant to the following Resolution adopted by its Board of Directors on the 23rd day of July, 2004:

"RESOLVED, That any two officers of the Company have the authority to make, execute and deliver a Power of Attorney constituting as Attorney(s)-in-fact such persons, firms, or corporations as may be selected from time to time.
FURTHER RESOLVED, that the signatures of such officers and the Seal of the Company may be affixed to any such Power of Attorney or any certificate relating thereto by facsimile; and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company; and any such powers so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, the Evergreen National Indemnity Company has caused its corporate seal to be affixed hereunto, and these presents to be signed by its duly authorized officers this 1st day of June, 2017.

EVERGREEN NATIONAL INDEMNITY COMPANY

By: _____
Matthew T. Tucker , President

By: _____
David A. Canzone, CFO

Notary Public)
State of Ohio) SS:

On this 1st day of June, 2017, before the subscriber, a Notary for the State of Ohio, duly commissioned and qualified, personally came Matthew T. Tucker and David A. Canzone of the Evergreen National Indemnity Company, to me personally known to be the individuals and officers described herein, and who executed the preceding instrument and acknowledged the execution of the same and being by me duly sworn, deposed and said that they are the officers of said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of said Corporation, and that the resolution of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at Cleveland, Ohio, the day and year above written.

PENNY M HAMM
NOTARY PUBLIC
STATE OF OHIO
Comm. Expires
04-04-2022

_____
Penny M. Hamm, Notary Public
My Commission Expires April 4, 2022

State of Ohio) SS:

I, the undersigned, Secretary of the Evergreen National Indemnity Company, a stock corporation of the State of Ohio, DO HEREBY CERTIFY that the foregoing Power of Attorney remains in full force and has not been revoked; and furthermore that the Resolution of the Board of Directors, set forth herein above, is now in force.

Signed and sealed in Mayfield Hts, Ohio this 27th day of September, 2019.

_____
Wan C. Collier, Secretary

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

BOND FOR CONFORMANCE

By authority of Part 625, Mineral Wells, Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

MINERAL WELL OPERATIONS BOND	
Bond number	Well name and number
880310	Carleton Farms Landfill - Well IW#2-36E

Part 625 Bond Amounts		
Individual test well permit	Blanket test well permit	Disposal, storage, or brine well
☐ $5,500.00 for a depth of 0 to 1000'	☐ $5,500.00 for 1 to 24 wells	☐ $33,000.00 for a single well
☐ $11,000.00 for a depth greater than 1000' to 2000'	☐ $11,000.00 for 25 to 49 wells	Disposal, storage, brine, and individual test well
☐ $22,000.00 for a depth greater than 2000' to 4000'	☐ $16,500.00 for 50 to 75 wells	
☐ $33,000.00 for a depth greater than 4000'	☐ $22,000.00 for 76 to 200 wells	☐ $440,000.00 for blanket coverage

Republic Services of Michigan I, LLC
2880 Clark Road
New Boston, MI 48164

(Name and Address of Principal)

in the State of Michigan as Principal and

Evergreen National Indemnity Company
6140 Parkland Blvd, Suite 321
Mayfield Heights, OH 44124

(Name and Address of Surety)

a corporation organized and existing under the laws of the State of Ohio and duly authorized to transact business in the State of Michigan, as Surety, are held and firmly bound unto the State of Michigan in the penal sum of

One Hundred Twenty One Thousand and 00/100 Dollars.

The Principal named is about to commence and prosecute to final completion well(s) authorized by permits issued or to be issued under Part 625, Act 451 PA 1994, as amended.

"Final completion" means either of the following: (1) The time when locating, drilling, deepening, converting, operating, producing, reworking, plugging, and proper site restoration have been performed on a well in a manner approved by the supervisor of mineral wells, including the filing of the mandatory records; (2) The time when a permit has been issued to convert an existing well subject to this part to a purpose allowed under another act or another part of the act.

When the Principal complies with the provisions of Part 625, Act 451 PA 1994, as amended, in the final completion of the well(s), the Surety's obligations can be terminated otherwise this obligation remains in full force and effect. The Surety's liability herein is co-extensive with that of the Principal and the State of Michigan has the same remedies against the Surety as against the Principal.

The Surety, by execution of the bond, accepts the liability covered by prior bond(s) _____

_____

(number(s) and company)

and gives notice to the Supervisor of Mineral Wells of the need for terminating the prior bond(s) as listed herein with such termination to be effective as of the time that this bond becomes effective.

Signed, sealed and dated the 27th day of September, 2019.

Republic Services of Michigan I, LLC
(Principal)

By _____
(Signature)

Amber Engel, Attorney-in-Fact
(Name and title)

Evergreen National Indemnity Company
(Surety)

By _____
(Signature)

Timothy S. Buhite, Attorney-in-Fact
(Name and title)

When the Principal or Surety executes this bond by an agent, power of attorney or other evidence of authority must accompany the bond.

DEQ USE ONLY	
Permit number	Issue date
Type of well	

MAIL TO:
OIL, GAS, AND MINERALS DIVISION
MICHIGAN DEPT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
P.O. BOX 30256
LANSING, MI 48909-7756

EQP 7200-03MW (rev. 5/2019)

POWER OF ATTORNEY

Republic Services, Inc., a Delaware corporation having its principal place of business at 18500 N. Allied Way, Phoenix, Arizona 85054, hereby makes, constitutes and appoints USI INSURANCE SERVICES NATIONAL, INC., acting through and by any one of Debbie Lindstrom, John Drummey, Jr., Timothy S. Buhite, Kathleen M. Mitchell, Scott C. Alderman, Peggy A. Firth, Brandi Heinbaugh, Amber Engel, Jamie Stroh, Holly E. Ulfers, Katie Snider, or Roxana Palacios its true and lawful attorney to sign and seal any and all surety bonds, bid bonds, performance bonds and payment bonds at or below the monetary threshold of Five Million Dollars ($5,000,000.00) on behalf of REPUBLIC SERVICES, INC. and its subsidiaries, relating to the provision of solid waste collection, transportation, transfer, recycling, disposal and/or energy services by REPUBLIC SERVICES, INC. and its subsidiaries and affix its corporate seal to and deliver for and on behalf as surety thereon or otherwise, bonds of any of the following classes, to wit:

1. Surety bonds, bid bonds, performance bonds and payment bonds to the United States of America or agency thereof, including those required or permitted under the laws or regulations relating to Customs or Internal Revenue; license and permit bonds or other indemnity bonds under the laws, ordinances or regulations of any state, city, town, village, board, other body organization, public or private; bonds to transportation companies; lost instrument bonds; lease bonds; worker's compensation bonds; miscellaneous surety bonds; and bonds on behalf of notaries public; sheriffs, deputy sheriffs and similar public officials.

2. Surety bonds, bid bonds performance bonds and payment bonds on behalf of REPUBLIC SERVICES, INC. and its subsidiaries in connection with bids, proposals or contracts.

REPUBLIC SERVICES, INC. hereby agrees to ratify and confirm whatsoever USI INSURANCE SERVICES NATIONAL, INC. shall lawfully do pursuant to this power of attorney, and until notice or revocation has been given by REPUBLIC SERVICES, INC., the acts of said attorney shall be binding on the undersigned.

IN WITNESS WHEREOF, this Power of Attorney has been signed this, 2 day of January 2019 on behalf of REPUBLIC SERVICES, INC. by its Assistant Secretary Eileen B. Schuler.

REPUBLIC SERVICES, INC.,
a Delaware Corporation

Eileen B. Schuler

STATE OF ARIZONA

COUNTY OF MARICOPA

Subscribed and sworn to before me this 2ND day of JANUARY, 2019 by Eileen B. Schuler, Assistant Secretary.

OFFICIAL SEAL
MATTHEW NORDQUIST
Notary Public - Arizona
MARICOPA COUNTY
My Commission Expires
MAY 31, 2019

Notary Public

EVERGREEN NATIONAL INDEMNITY COMPANY
MAYFIELD HEIGHTS, OH
POWER OF ATTORNEY

POWER NO. 880310

KNOW ALL MEN BY THESE PRESENTS: That the Evergreen National Indemnity Company, a corporation in the State of Ohio does hereby nominate, constitute and appoint:

Timothy S. Buhite

its true and lawful Attorney(s)-In-Fact to make, execute, attest, seal and deliver for and on its behalf, as Surety, and as its act and deed, where required, any and all bonds, undertakings, recognizances and written obligations in the nature thereof, PROVIDED, however, that the obligation of the Company under this Power of Attorney shall not exceed Fifteen Million Dollars and 00/100 ($15,000,000.00)

This Power of Attorney is granted and is signed by facsimile pursuant to the following Resolution adopted by its Board of Directors on the 23rd day of July, 2004:

"RESOLVED, That any two officers of the Company have the authority to make, execute and deliver a Power of Attorney constituting as Attorney(s)-in-fact such persons, firms, or corporations as may be selected from time to time.
FURTHER RESOLVED, that the signatures of such officers and the Seal of the Company may be affixed to any such Power of Attorney or any certificate relating thereto by facsimile; and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company; and any such powers so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, the Evergreen National Indemnity Company has caused its corporate seal to be affixed hereunto, and these presents to be signed by its duly authorized officers this 1st day of June, 2017.

EVERGREEN NATIONAL INDEMNITY COMPANY

By: _____
Matthew T. Tucker , President

By: _____
David A. Canzone, CFO

Notary Public)
State of Ohio) SS:

On this 1st day of June, 2017, before the subscriber, a Notary for the State of Ohio, duly commissioned and qualified, personally came Matthew T. Tucker and David A. Canzone of the Evergreen National Indemnity Company, to me personally known to be the individuals and officers described herein, and who executed the preceding instrument and acknowledged the execution of the same and being by me duly sworn, deposed and said that they are the officers of said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of said Corporation, and that the resolution of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at Cleveland, Ohio, the day and year above written.

PENNY M HAMM
NOTARY PUBLIC
STATE OF OHIO
Comm. Expires
04-04-2022

_____
Penny M. Hamm, Notary Public
My Commission Expires April 4, 2022

State of Ohio) SS:

I, the undersigned, Secretary of the Evergreen National Indemnity Company, a stock corporation of the State of Ohio, DO HEREBY CERTIFY that the foregoing Power of Attorney remains in full force and has not been revoked; and furthermore that the Resolution of the Board of Directors, set forth herein above, is now in force.

Signed and sealed in Mayfield Hts, Ohio this 27th day of September, 2019.

_____
Wan C. Collier, Secretary

A.9 The permit application fee as specified by statute:

Disposal well for disposal of waste products	**$**	**2,500.00**
Disposal well for processed brine		**500.00**
Storage well		**500.00**
Natural or artificial brine production well		**500.00**

A copy of the electronic submission of permit application fees ,in the amount of $2,500 per well that was submitted to the State of Michigan, is presented at the end of this section (A.9).

Receipt

EGLE MNRL WLL DRLL PRMT

Payment Receipt

PRINT

Merchant Location Code: 00001
Payment Status: Success
Payment Date: 11/04/2019
Posting Date: 11/04/2019
Confirmation Number: 19110451062992
Billing Address: Republic Services of Michigan I, LLC
28800 Clark
New Boston, MI 48164
(734) 271-6147
E-Mail Address: cpearse@republicservices.com
Total Amount: 2500.00 USD
Card Type: VISA
Account #: x5294
Authorization Code: 09001S
Reference: IW1-36N

Receipt

EGLE MNRL WLL DRLL PRMT

Payment Receipt

PRINT

Merchant Location Code: 00001
Payment Status: Success
Payment Date: 11/04/2019
Posting Date: 11/04/2019
Confirmation Number: 19110451064214
Billing Address: Republic Services of Michigan I, LLC
28800 Clark
New Boston, MI 48164
(734) 271-6147
E-Mail Address: cpearse@republicservices.com
Total Amount: 2500.00 USD
Card Type: VISA
Account #: x5294
Authorization Code: 06237S
Reference: IW2-36E

A.10 An organization report, form EQP 7200-13, if a current organization report is not on file with the supervisor.

The Organization Report presenting the current corporate organizational status of Carleton Farms Landfill is presented on form EQP 7200-13, at the end of this Section (A.10).

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

WELL PERMITTEE ORGANIZATION REPORT

Required by authority of Part 615 SUPERVISOR OF WELLS and Part 625 MINERAL WELL, Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This form is used for the purpose of defining those responsible for making operational decisions and serves to register individuals authorized to prepare and/or submit information on behalf of the well permittee to the Department of Environmental Quality - Oil, Gas, and Minerals Division (DEQ-OGMD). Non-submission and/or falsification of this information may result in fines and/or imprisonment.

PURPOSE FOR FILING: ☒ New ☐ Change of Principal or Agent ☐ Address Correction ☐ Name Change

ORGANIZATION Enter the complete organization name, plan, and current business addresses and phone number.

1. Company name (as shown on permit to drill)	Republic Services of Michigan I, LLC
Mailing Address	28800 Clark Road
City, State, Zip	New Boston, Michigan 48164
Street Address	28800 Clark Road
City, State, Zip	New Boston, Michigan 48164
Phone	734-271-6147
Fed. ID No.	65-0872399

2. If organization shown in 1 is a subsidiary or an assumed name (dba), give name and address of associated or parent company or person

3. Current Organization Plan (check one)

☐ Corporation ☐ Joint Venture ☐ Limited Partnership ☒ Limited Liability Company
☐ Partnership ☐ Trust ☐ Sole Proprietorship ☐ Other

4. If reorganization or name change, name & address of previous organization

5. PRINCIPALS List all corporate officers, directors, incorporators, partners, or shareholders who have the authority to or responsibility for making operational decisions including siting, drilling, operating, producing, reworking, and plugging of wells. Attach extra sheet if needed.

First Name	Last Name	Phone Number	Email	Address	City	State	Zip
Robert	Boyer			18500 N Allied Way	Phoenix	AZ	85054
Gregg	Brummer			18500 N Allied Way	Phoenix	AZ	85054
Tim	Benter			18500 N Allied Way	Phoenix	AZ	85054
Brent	Goodsell			1832 Landsdale Ave	Indianapolis	ID	46202
Myndi	Kort			18500 N Allied Way	Phoenix	AZ	85054

6. EMPLOYEES List the names of persons, employees of the organization, who are authorized to submit applications, workplans, or records pursuant to the above cited Act(s). Attach extra sheet if needed.

First Name	Last Name	Phone Number	Email	In Checking 'YES' it is acknowledged that these individuals are authorized for electronic submittals on behalf of the company. OGMD will assign passwords and log-in information to these individuals, thereby allowing them to submit within the EFORMS system.	
Brian	Josupeit	734-731-7020	bjosupeit@republicservices.com	☒ YES	☐ NO
James	Reese	734-271-6147	jreese@republicservices.com	☒ YES	☐ NO
Christina	Pearse	734-231-8217	cpearse@republicservices.com	☒ YES	☐ NO
				☐ YES	☐ NO
				☐ YES	☐ NO

7. AGENTS List the names of persons, other than employees of the organization, who are authorized to submit applications, workplans, or records pursuant to the above cited Act(s). Attach extra sheet if needed.

First Name	Last Name	Phone Number	Email	In Checking 'YES' it is acknowledged that these individuals are authorized for electronic submittals on behalf of the company. OGMD will assign passwords and log-in information to these individuals, thereby allowing them to submit within the EFORMS system.	
Ken	Cooper	303-290-9414	ken.cooper@petrotek.com	☒ YES	☐ NO
Connie	Walker	303-290-9414	cwalker@petrotek.com	☒ YES	☐ NO
Aaron	Payne	303-290-9414	apayne@petrotek.com	☒ YES	☐ NO
				☐ YES	☐ NO
				☐ YES	☐ NO

Certification "I state that I am authorized to make this report. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Name of a principal	Signature	Date
Brent Goodsell		10/30/19

Mail original to: Permits and Bonding Unit, Oil, Gas, and Minerals Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30256, Lansing, MI 48909-7756; or EGLE-OGMDpermitapplications@Michigan.gov.

EQP 7200-13 (rev. 5/2019)

A.11 Description of the drilling program, including the drilling fluid and mud program, how the fluids will be handled and ultimate disposition of the drilling fluids. Include a discussion of whether overpressured zones are anticipated and how the mud program will be modified to accommodate such a condition.

The proposed wells (IW#1-36N and IW#2-36E) will be newly installed Class I non-hazardous wells located in Section 36, T4S, R8E, in New Boston, Wayne County, Michigan. Ground level is estimated to be approximately 627 feet above sea level (ft ASL) at IW#1-36N and 623 ft ASL at IW#2-36E, with Kelly Bushing (KB) that will be dependent on the type of rig available. All referenced depths provided below and throughout this application are in feet below ground level (ft BGL). The wells will be drilled to a total depth (TD) of approximately 3,800 ft BGL (estimated TD of 3,827 ft BGL at IW#1-36N and 3,802 ft BGL at IW#2-36E) through the Mt. Simon. CFL intends to complete the interval from the Franconia/Dresbach through the Mt. Simon. Proposed well schematics for the IW#1-36N and IW#2-36E wells are provided on Figures A.11-1 and A.11-2, respectively.

Drilling, Casing and Testing Program

Upon preparation of the site and mobilization of required equipment, 20" conductor casing will be driven to approximately 40 feet. If driven casing is not practical due to equipment availability or other factors, the 20-inch, 94 lb/ft, H-40 grade, ST&C (short threaded and coupling), or suitable equivalent conductor casing will be cemented to surface in a 26" borehole to an anticipated depth of approximately 40 feet BGL. If a gauge borehole diameter is assumed and 25% excess cement is assumed, approximately 64 sacks (sx) of 1.18 ft^3/sx yield Michigan equivalent Class A cement with additives or suitable equivalent would be utilized to cement the string to surface. Site specific conditions will be used to further refine cement volume.

A 17-1/2" borehole will then be drilled out of conductor casing to a depth of approximately 500 feet BGL into the Bass Island Group. Confirmation of the base of underground source of drinking water (estimated at 400 ft BGL, or the base of the Bois Blanc) will be conducted via geophysical logging. The hole will be conditioned and 13 3/8", 54.5 lb/ft, K-55 ST&C (or suitable equivalent) surface casing will be installed from surface to a depth of approximately 500 feet BGL. If a gauge borehole diameter is assumed and 75% excess cement is assumed, approximately 535 sacks (sx) of 1.18 ft^3/sx yield Michigan equivalent Class A cement with additives or suitable equivalent would be utilized to cement the string to surface. It is anticipated that a float shoe will be used with a float collar located one joint off bottom, and that centralizers will be placed at a minimum of one every third joint depending on hole condition.

After the surface casing string has been cemented and a minimum of 36 hours waiting on cement (WOC) time has elapsed, the remaining cement will be drilled out of the surface casing shoe and a 12-¼ inch hole will then be drilled to approximately 1,400 feet BGL, into the Clinton Formation (i.e., through the Niagaran). Openhole logging will be completed from the total depth of the hole to the base of the surface casing. A

cement bond log will be conducted over the surface casing interval to demonstrate cement integrity behind the surface casing. Open hole logging will be conducted from the base of the intermediate casing to the surface casing shoe. After the logging/testing program is completed, the hole will be conditioned and 9-⅝" 36 lb/ft, K-55 ST&C (or suitable equivalent) intermediate casing will be installed from surface to a depth of approximately 1,400 feet BGL. If a gauge borehole diameter is assumed and 75% excess cement is assumed, approximately 688 sacks (sx) of 1.18 ft^3/sx yield Michigan equivalent Class A cement with additives or suitable equivalent would be utilized to cement the string to surface. It is anticipated that a float shoe will be used with a float collar located one joint off bottom, and that centralizers will be placed at a minimum of one every third joint depending on hole condition.

After the 9-⅝" intermediate casing string has been cemented and a minimum of 36 hours waiting on cement (WOC) time has elapsed, remaining cement will be drilled out of the intermediate casing string shoe and an 8-¾" hole will then be drilled to a depth of approximately 3,281 feet BGL at IW#1-36N and 3,251 feet BGL at IW#2-36E, which corresponds to the projected depth of the top of the Franconia/Dresbach. A cement bond log will be conducted over the intermediate casing interval at each well to demonstrate cement integrity behind the casing. Openhole logging will be completed from the total depth of the 8-¾" hole to the base of the intermediate casing. After the first phase of the deep openhole logging program is complete (see Table A.13-1, Section A.13), the hole will be conditioned and 7", 26 lb/ft, N-80 LT&C (long threaded and coupling), or suitable equivalent, long-string casing will be installed to a depth of approximately 3,250 to 3,280 feet BGL in both wells. The cementing program for the long-string casing will be determined based on field conditions, but is planned to consist of a mixture of Michigan equivalent Class A standard cement with additives or suitable equivalent. Depending on hole conditions and geologic considerations, light-weight cement and/or a two-stage cement job utilizing a DV tool may be utilized. Assuming single-stage cement jobs and 25% excess, the required cement volumes are approximately 548 sacks and 543 sacks for IW#1-36N and IW#2-36E, respectively. Additional excess cement, if any, will be pumped based on field conditions. It is anticipated that a float shoe will be used with a float collar one joint up from the bottom and that centralizers are to be placed a minimum of one every third joint.

Shoe cement will then be drilled out of the 7" casing and the well will be deepened using a 6" or 6 ⅛" bit to the base of the injection zone (i.e., Mt. Simon estimated to be 3,827 ft BGL at IW#1-36N and 3,802 ft BGL at IW#2-36E). Note that a total depth of ~3,800 ft BGL was assumed as a conservative measure to account for formation top variability. A drill stem test (DST) may be conducted to obtain a sample of injection interval fluids prior to reaching total depth; after drilling is completed, openhole logging will be conducted to obtain additional data regarding the injection interval. In addition, a cement bond log and baseline casing inspection log will be conducted over the long string casing interval, and a directional survey will be conducted to ascertain the trajectory and bottom hole location of the well. Note that standard site Health and Safety procedures will be implemented during well installation, including daily and task-specific safety meetings. As needed, methane monitoring will be conducted to identify any potential

explosion hazards.

The packer at each well will be set to a depth of within 100 feet of the long-string casing shoe. Initial projections of packer placement are at depths of approximately 3,231 feet at IW#1-36N and approximately 3,201 feet at IW#2-36E inside the 7" long-string casing, and 3-½" OD, 9.2 lb/ft, J-55 LT&C tubing will be run from the packer to surface. As appropriate, coated or lined tubing and packer may be used to manage potential corrosion issues. A radioactive tracer survey (RAT) and a temperature log will then be conducted to establish baseline conditions and to demonstrate initial external mechanical integrity. A pressure transient test will also be conducted to derive estimates of formation pressure and properties (See Section A.14). Schematics summarizing the proposed IW#1-36N and IW#2-36E well completions are presented as Figures A.11-1 and A.11-2, respectively.

No over-pressured zones are anticipated during drilling of the CFL wells; within the two-mile Area of Review there is one historical well that had minimal production in the Trenton that was plugged and abandoned in 1947, and four historical wells that were drilled in the Trenton and were dry holes. If under-pressured zones are encountered, lost-circulation materials will be utilized to control fluid loss as necessary based on well conditions. Fresh water will be trucked to the site using local oilfield suppliers or a pre-existing water well already located on the property will be used to supply water during drilling and testing of this well. Fresh water will be used as the drilling fluid, and will be held in on-site tanks with no in-ground pits. Upon completion of drilling operations, remaining fluids and solids will be disposed of on-site or off-site by a licensed waste hauler or a suitable equivalent contractor.

The first well to be drilled is expected to be installed and tested in the year 2020 or 2021 according to applicable regulations and permit requirements. Static pressure testing of the openhole injection interval will be performed, along with determination of various injection interval characteristics such as permeability-thickness that would be determined via pressure transient testing. Injection formation native brine chemistry and characteristics will be determined based on acquisition of a fluid sample. Characteristics of the injection interval will also be evaluated based on geophysical well logging results. Additional details regarding the well logging are presented in Table A.13-1 in Section A.13.

Based on equipment availability, prior to conducting any injection testing, injection interval fluid will be produced from the targeted injection formation using either a submersible pump or swabbing equipment. Based on fluid loss encountered during drilling and field conditions, target production volumes for obtaining representative samples will be adjusted in the field, based on conditions encountered. Field parameters including pH and conductivity will also be monitored at surface as fluid is recovered to determine when representative sampling is practical. Injection interval formation fluid will be subjected to analysis for the following parameters:

- Alkalinity, Arsenic, Barium, Bicarbonate, Cadmium, Calcium, Carbonate,

Chloride, Chromium, Conductivity, Copper, Hardness, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrate as (N), pH, Potassium, Radium 226, Radium 228, Selenium, Silica as SiO2, Sodium, Specific Gravity, Strontium, Sulfur, TDS, TSS, Zinc

Mechanical integrity and ambient monitoring will be conducted after well construction activities are complete. Annual Part I mechanical integrity testing (MIT) and 5-year Part II MIT for the two proposed wells are detailed below. CFL will provide the agency a minimum of 30 days notice prior to annual testing. Although test procedures or methods may be changed based on approval by EGLE staff, the following procedure will be used for the first such testing performed:

1. Conduct Wellsite Safety Meeting
    a. Prior to commencement of field activities, conduct safety meeting with contractors and personnel to be involved with field services and MIT testing. Ensure that all safety procedures are understood and review days' work activities.

2. Conduct Reservoir (Fall-Off or Static) Pressure Test
    a. For fall-off, record data regarding test well injection at typical operating conditions (constant rate). Rate versus time data will be recorded during the injection period. Cumulative injection volume will also be recorded. Continue injection for a minimum of approximately 8 hours. Note that significant rate variations may yield poor quality data or require more complicated analysis techniques.
    b. Rig-up pressure gauge and run in well to a depth likely not to exceed approximately 3,300 feet, or other depth approved by EGLE.
    c. For pressure transient fall-off, obtain final stabilized injection pressure for a minimum of 1 hour. For static test, collect a minimum of two pressure/temperature readings at depth. Ensure that the gauge temperature readings have also stabilized.
    d. After gauge recordings are stable, cease injection and monitor pressure fall-off. Continue monitoring pressure for a minimum of 8 hours or until a valid observation of fall-off curve is observed. For a static gradient survey, the well will be shut-in for a minimum of 48 hours before testing. Wellbore pressure gradients will be obtained to establish fluid gradient and bottomhole pressure data will be collected for a minimum of 4 hours for static testing.
    e. Stop test data acquisition, rig-down and release equipment.

3. Annulus Pressure Test
    a. Stabilize well pressure and temperature.
    b. As practical, arrangements will be made for a representative from EGLE to be present to witness testing.
    c. Install ball valve or similar type "bleed" valve on annulus gate valve. Pressurize annulus to a minimum of 100 psig above maximum permitted

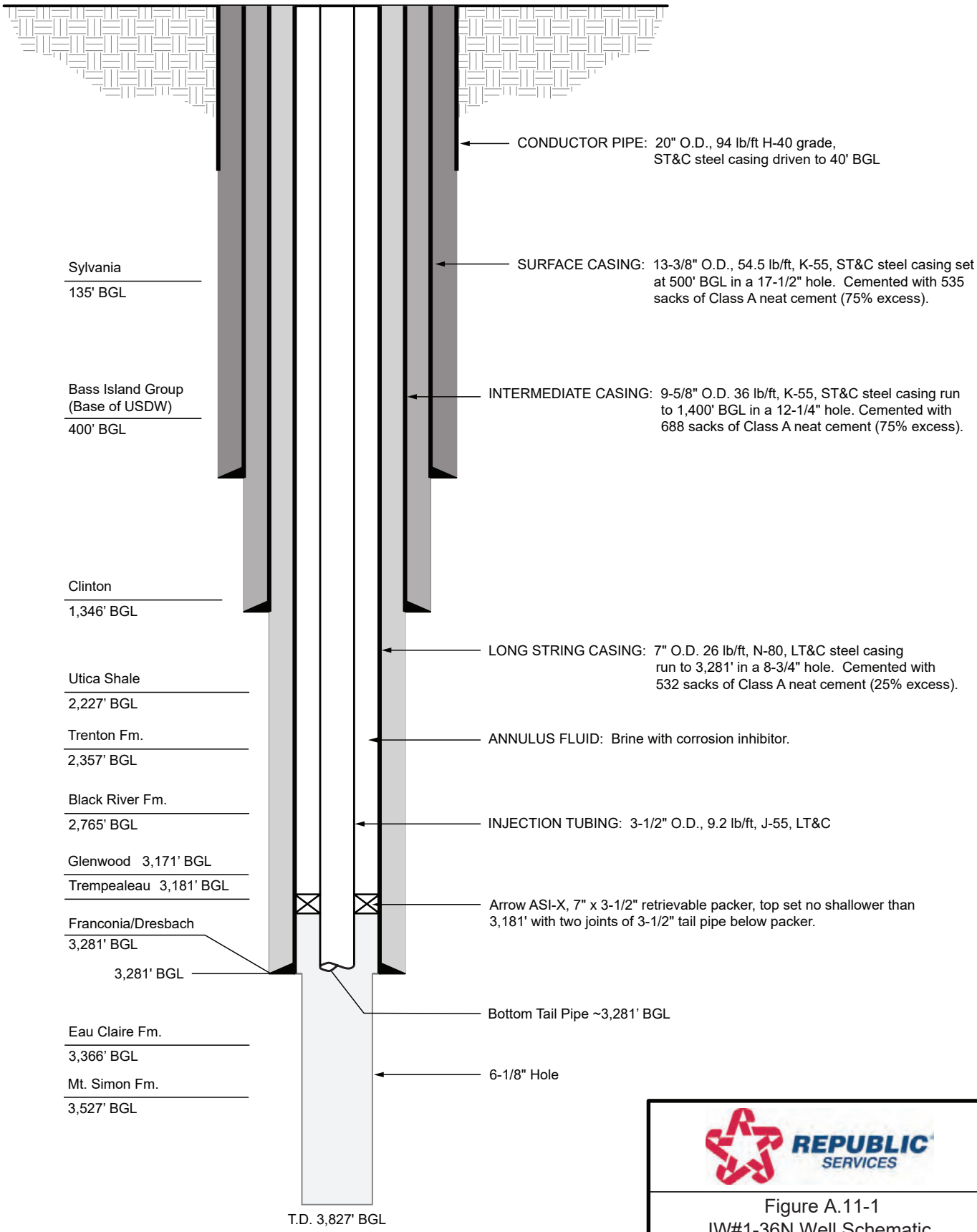
operating pressure and shut-in valve. Install certified gauge on “bleed” type valve. The annulus may need to be pressurized and bled off several times to ensure an absence of air.

d. Monitor and record pressure for 1 hour. Pressure may not fluctuate more than 3% during the one-hour test.
e. Lower the annulus pressure to normal operating pressure at the end of the test.

Part II mechanical integrity demonstration, as required by EGLE, for the well will be accomplished via a minimum of one approved logging method such as temperature log, or radioactive tracer survey, or noise log, or oxygen activation log. CFL will provide the agency with a minimum of a 30-day notice of Part II testing as practical to allow the agency an opportunity to witness data collection activities.

Although CFL may utilize any acceptable method per EGLE procedure approval, at this time it is proposed that temperature logging be utilized for 5-year Part II mechanical integrity testing. Static temperature logging is to be conducted as follows:

1. Conduct Temperature Log
    a. Shut-in well for stabilization (minimum of 36 hours, or as required by EPA/EGLE) prior to running base temperature log.
    b. Rig-up temperature log and run base log from surface to total depth. Pull tool to surface and shut-in master valve.
    c. Rig-down equipment and return the well to normal operations.



NOTE:

- NOT TO SCALE

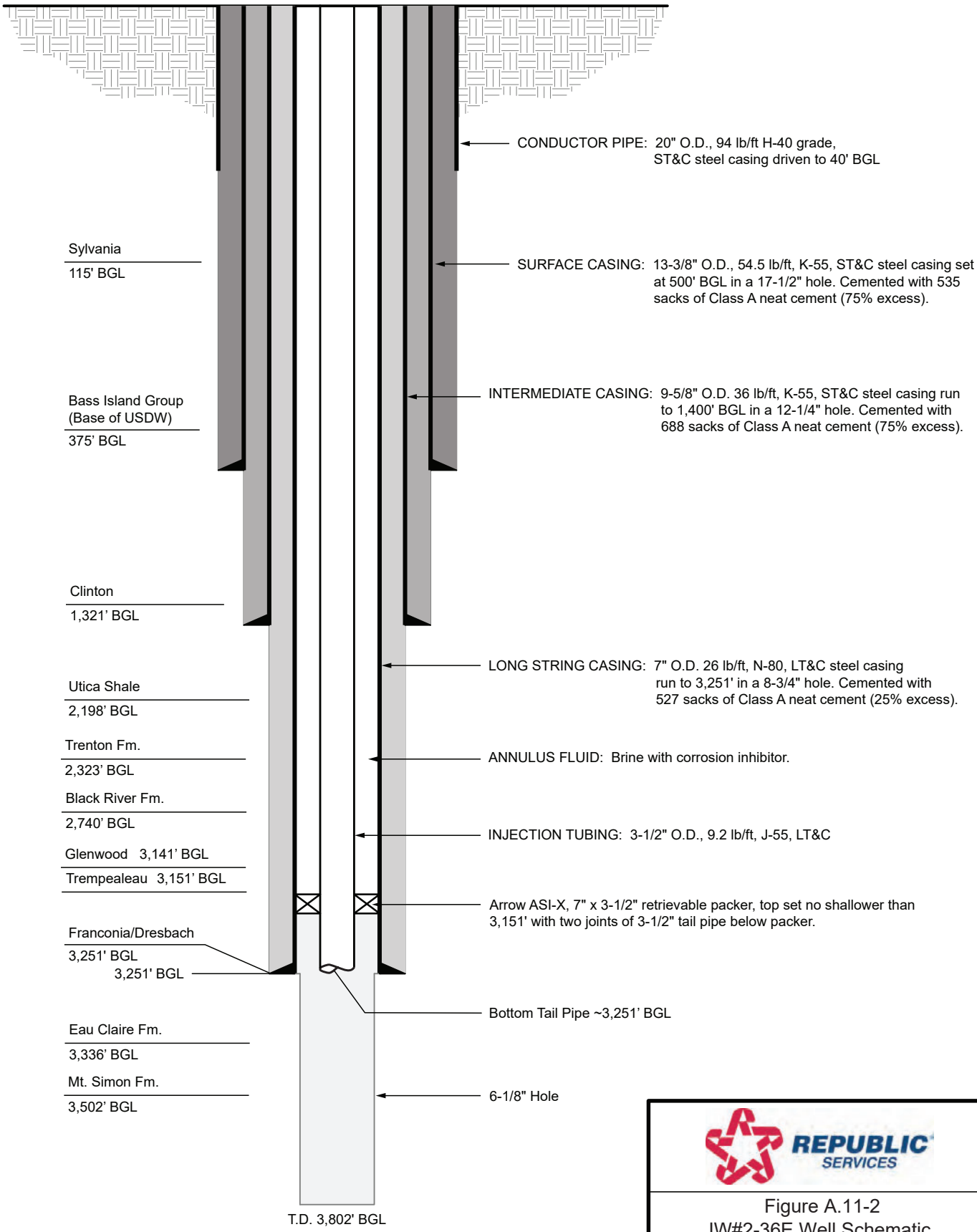
REPUBLIC SERVICES

Figure A.11-1
IW#1-36N Well Schematic,
Carleton Farms Landfill

2019 Permit Application

Scale: NTS	Date: May 2020	
2019_CFL_EGLE_Fig_A.11-01.pdf	By: WEK	Checked: CW

Petrotek
5935 South Zang Street, Suite 200
Littleton, Colorado 80127 USA
303-290-9414
www.petrotek.com



NOTE:

- NOT TO SCALE

REPUBLIC SERVICES

Figure A.11-2
IW#2-36E Well Schematic,
Carleton Farms Landfill

2019 Permit Application

Scale: NTS	Date: May 2020	
2019_CFL_EGLE_Fig_A.11-02.pdf	By: WEK	Checked: CW

Petrotek
5935 South Zang Street, Suite 200
Littleton, Colorado 80127 USA
303-290-9414
www.petrotek.com

A.12 Description of the cementing program including the type, properties and compressive strength of cement to be used on each casing string. Indicate if DV tools will be used.

Figures A.11-1 and A.11-2 present the wellbore diagrams for the proposed IW#1-36N and IW#2-36E wells. The cement used for all cement jobs will be Michigan equivalent type A cement; 2% bentonite and 2% $CaCl_2$ may be required depending on field conditions. Assuming no bentonite or additives, the water requirements will be 5.2 gallons/sack with a slurry yield of 1.18 ft^3/sack. Any casing shoe tests (intermediate and long-string casing only) will be run at values conservatively estimated to be below fracture pressure. At a depth of 500 feet (surface casing), assuming a bottom hole gradient not to exceed 0.7 psi/ft and a normally pressured formation (0.433 psi/ft) at the shoe, a differential pressure (Δp) of less than 135 psi (500 * [0.7 – 0.433]) would be applied at the casing shoe. At a depth of 1,400 feet (intermediate casing), assuming a bottom hole gradient not to exceed 0.7 psi/ft and a normally pressured formation (0.433 psi/ft) at the shoe, a differential pressure (Δp) of less than 374 psi (1,400 * [0.7 – 0.433]) would be applied at the casing shoe. At a depth of 3,280 feet (long-string casing), assuming a bottomhole gradient not to exceed 0.7 psi/ft, and a normally pressured formation at the shoe, a Δp of less than 880 psi (3,280 * [0.7 – 0.433]) would be applied to the casing shoe. As noted by Bourgouyne et al. (1991) in Section 3.4.11 of his text, the exact amount of compressive strength needed before drilling activities can continue is difficult to determine, but a value of 500 psi is commonly used in field practice. Compressive strengths that exceed projected test pressures for the proposed cement blends over the range of temperatures expected (60 to 80 degrees Fahrenheit) conservatively referenced at atmospheric pressure are given in the following table:

Time (Hours)	Class A 60°F Compressive Strength (psi)	Class A 80°F Compressive Strength (psi)	2% Bentonite 60°F with 2% CaCl Compressive Strength (psi)	2% Bentonite 80°F with 2% CaCl Compressive Strength (psi)
8	20	265	135	620
12	80	580	255	1,150
24	615	1,905	765	1,820
36*	1,087*	2,823*	1,420*	--
72	2,050	4,125	--	--

*extrapolated

The cement volumes for each wellbore section up to and including the 7” casing cement job are summarized in the following table. Excess cement volumes may be increased depending on caliper logging.

Interval	Hole Size (in)	Casing Size (in)		Depth (ft BGL)	Excess Cement (%)	Cement Required (sacks)
		OD	ID			
Conductor	26.000	20.000	19.124	40	25%	64*
Surface	17.500	13.375	12.615	500	75%	535
Intermediate	12.250	9.625	8.921	1,400	75%	688
Long String:						
IW#1-36N	8.750	7.000	6.276	3,281	25%	548
UW#2-36E				3,251	25%	543

**optional if conductor casing is driven*

Unexpectedly high permeability or low reservoir pressure may require two cement stages for a particular cement job; in this case, a DV tool may be utilized. It is anticipated that each cement job will be completed in a single stage unless conditions require a two-stage job. Any change to the procedure based on field conditions will be provided to EGLE by email at least 24-hours in advance of cementing.

REFERENCES

Bourgouyne, A.T., Martin E. Chenevert, Keith K. Millheim, F.S Young Jr., 1991. Applied Drilling Engineering, SPE Textbook Series, Volume 2.

A.13 Description of the proposed wireline logging program.

The proposed wireline logging program is summarized in Table A.13-1, below.

Table A.13-1. List of Proposed Logs, CFL IW#1-36N and IW#2-36E

Description	Estimated Depth Run
Dual LateroLog, SP, Gamma Ray, Compensated Neutron, and Caliper Logs (Openhole before installing surface casing to ~500 ft)	500 ft BGL – ~100 ft BGL
Dual LateroLog, SP, Gamma Ray, Compensated Neutron, and Caliper Logs (Openhole before installing intermediate casing to ~1,400 ft)	1,400 ft BGL – Surface Casing Shoe (~500 ft BGL)
Dual LateroLog, SP, Gamma Ray, Formation Density, Compensated Neutron, Caliper, and Fracture Finder ID Logs (Openhole before installing long-string casing)	1,400 – 3,281 ft BGL (IW#1-36N) 1,400 – 3,241 ft BGL (IW#2-36E)
Cement Bond Log (Surface, Intermediate casing)	- Surface casing shoe to surface - Intermediate casing shoe to surface casing shoe
Dual LateroLog, SP, Gamma Ray, Formation Density, Compensated Neutron, Caliper, and Fracture Finder ID Logs (Openhole)	Franconia to Mt. Simon Injection Interval (6 1/8” openhole)
Cement Bond Log, Casing Inspection Log and Directional Survey (Long-string casing)	Long-string shoe to surface shoe

A.14 Description of the testing program, including pressure tests on casing strings, and any planned drill stem tests.

The first well is expected to be installed and tested in the year 2020 or 2021 according to applicable regulations and permit requirements. Static pressure testing of the open hole injection interval will be performed, along with determination of various injection interval characteristics such as permeability-thickness that would be determined via pressure transient testing. Injection formation native brine chemistry and characteristics will be determined based on acquisition of a fluid sample. Characteristics of the injection interval will also be evaluated based on geophysical well logging results. Additional details regarding the well logging are presented in Table A.13-1 in Section A.13. The following information is also presented in Section A.11 but is repeated to facilitate application review.

Based on equipment availability, prior to conducting any injection testing, injection interval fluid will be produced from the targeted injection formations using either a submersible pump or swabbing equipment. Based on fluid loss encountered during drilling and field conditions, target production volumes for obtaining representative samples will be adjusted in the field, based on conditions encountered. Field parameters including pH and conductivity will also be monitored at surface as fluid is recovered to determine when representative sampling is practical. Injection interval formation fluid will be subjected to analysis for the following parameters:

- Alkalinity, Arsenic, Barium, Bicarbonate, Cadmium, Calcium, Carbonate, Chloride, Chromium, Conductivity, Copper, Hardness, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrate as (N), pH, Potassium, Radium 226, Radium 228, Selenium, Silica as SiO2, Sodium, Specific Gravity, Strontium, Sulfur, TDS, TSS, Zinc

Mechanical integrity and ambient monitoring will be conducted after well construction activities are complete. Annual Part I mechanical integrity testing (MIT) and 5-year Part II MIT for each of the proposed wells are detailed below. CFL will provide the agency a minimum of 30 days notice prior to annual testing. Although test procedures or methods may be changed based on approval by EGLE staff, the following procedure will be used for the first such testing performed:

1. Conduct Wellsite Safety Meeting
    a. Prior to commencement of field activities, conduct safety meeting with contractors and personnel to be involved with field services and MIT testing. Ensure that all safety procedures are understood and review days' work activities.
2. Conduct Reservoir (Fall-Off or Static) Pressure Test
    a. For fall-off, record data regarding test well injection at typical operating conditions (constant rate). Rate versus time data will be recorded during the injection period. Cumulative injection volume will also be recorded. Continue injection for a minimum of approximately 8 hours. Note that

significant rate variations may yield poor quality data or require more complicated analysis techniques.

b. Rig-up pressure gauge and run in well to a depth likely not to exceed approximately 3,300 feet or other depth approved by EGLE.
c. For pressure transient fall-off, obtain final stabilized injection pressure for a minimum of 1 hour. For static test, collect a minimum of two pressure/temperature readings at depth. Ensure that the gauge temperature readings have also stabilized.
d. After gauge recordings are stable, cease injection and monitor pressure fall-off. Continue monitoring pressure for a minimum of 8 hours or until a valid observation of fall-off curve is observed. For a static gradient survey, the well will be shut-in for a minimum of 48 hours before testing. Wellbore pressure gradients will be obtained to establish fluid gradient and bottomhole pressure data will be collected for a minimum of 4 hours for static testing.
e. Stop test data acquisition, rig-down and release equipment.

3. Annulus Pressure Test
    a. Stabilize well pressure and temperature.
    b. As practical, arrangements will be made for a representative from the EGLE to be present to witness testing.
    c. Install ball valve or similar type “bleed” valve on annulus gate valve. Pressurize annulus to a minimum of 100 psig above maximum permitted operating pressure and shut-in valve. Install certified gauge on “bleed” type valve. The annulus may need to be pressurized and bled off several times to ensure an absence of air.
    d. Monitor and record pressure for 1 hour. Pressure may not fluctuate more than 3% during the one-hour test.
    e. Lower the annulus pressure to normal operating pressure at the end of the test.

Part II mechanical integrity demonstration, as required by EGLE, for the well will be accomplished via a minimum of one approved logging method such as temperature log, or radioactive tracer survey, or noise log, or oxygen activation log. CFL will provide the agency with a minimum of a 30-day notice of Part II testing as practical to allow the agency an opportunity to witness data collection activities.

Although CFL may utilize any acceptable method per EGLE procedure approval, at this time it is proposed that temperature logging be utilized for 5-year Part II mechanical integrity testing. Static temperature logging is to be conducted as follows:

1. Conduct Temperature Log
    a. Shut-in well for stabilization (minimum of 36 hours, or as required by EPA/EGLE) prior to running base temperature log.
    b. Rig-up temperature log and run base log from surface to total depth. Pull tool to surface and shut-in master valve.
    c. Rig-down equipment and return the well to normal operations.

A.15 Description of any planned coring program.

No coring program is currently planned during the drilling of the two proposed CFL wells.

B. Additional information required for an application for a permit to drill and operate a disposal well or to convert a previously drilled well to such a well:

B.1 Form EQP 7200-14, Injection Well Data.

Disposal well data is presented on form EQP 7200-14, which is attached at the end of this Section (B.1).

Items 1-7 on Form EQP-7200-14 are addressed as follows:

Item 1: Figure B.4-1 presents the location of oil, gas and injection wells within two miles of the proposed injection wells. As indicated in this figure and documented in other sections of this application, there are no oil, gas, or injection wells within 1,320 feet of either proposed injection well. Figure B.6-1 and Table B.6-1 present surface land owner information which show that Republic Services of Michigan, LLC, is the surface owner of property upon which wells will be drilled. International Transmission Co, Anchors Realty, and an unspecified Chief Financial Officer own surface property within 1,320 feet of proposed well IW#1-36N and City Environmental owns property within 1,320 feet of proposed well IW#2-36E. Form EQP 7200-1 presents well construction and location information for the proposed injection wells IW#1-36N and IW#2-36E.

Item 2: Forms EQP 7200-1 (submitted individually for IW#1-36N and IW#2-36E), and Figures A.4-8a and A.4-8b present the depth and location of the proposed wells. As indicated in Item 1, there are no oil, gas, or injection wells within 1,320 feet of the proposed wells. Figure A.4-6a and Table B.6-3 present location and information about freshwater, irrigation, and public water supply wells within 1,320 feet of the proposed well locations.

Item 3: This item is not applicable, because there are no oil, gas or injection wells within 1,320 feet of the proposed IW#1-36N and IW#2-36E well locations. Attachment C contains digital copies of the completion and plugging records of wells in the area of review. Section B.6 addresses artificial penetrations (i.e. oil, gas or injection wells) within the AOR, and shows that no wells in the AOR penetrate through the confining zone (i.e., Black River). Therefore, the only wells that could potentially require corrective action would be the proposed injection wells IW#1-36N and IW#2-36E; a contingency plan addressing these wells is presented on page B.6-5 that mandates well shut-in, agency notification, and well repair. The section also states although no corrective action plan is required for any artificial penetrations within the AOR, CFL commits to developing and implementing a plan should fluid migration occur above the confining layer.

Item 4: Not applicable. The application is not submitted for conversion of existing wells to injection wells.

Item 5: As discussed in Section B.7 on pages B.7-1 and B.7-2, karst or zonation at the bedrock-glacial material surface is expected to be minimal. Section B.8.2.4 (page B.8-23) states: " The presence of karst is possible where carbonate beds are near surface with the potential for influx of water that would facilitate dissolution. Sinkholes have been identified in Monroe county where carbonate units occur near ground level, and both Wayne and Monroe County have been identified as areas where sinkholes are infrequent or likely infrequent (Michigan State University Extension, 2008). The possibility of carbonate dissolution features near surface, [where the] Lucas subcrops [below glacial till] at the CFL, will be assessed during well installation". Section B.8.2.4 also states that while bedded salts occur north of the CFL near Detroit, the Salina Group contains very little salt at CFL and there is no information to indicate that salt mining occurs or has occurred with the AOR. There are also no other known resources that are or were mined in the AOR. Faults and structural features are addressed in Sections B.8.1.2 (page B.8-2) and B.8.2.1 (page B.8-12). These sections indicate that there are regional structural features such as the Green Fault which is 10 miles southwest of CFL, but site-specific data indicate there are no mappable faults that transect the injection or confining zones in the AOR at CFL. The injection and confining zones at CFL are laterally continuous, with no projected abrupt changes in thickness or lithology within a 5-mile radius of the Site. Regional seismicity is addressed in Section B.8.1.5 (page B.8-10), and local seismicity including the possibility of induced seismicity is addressed in Section B.8.2.3 (page B.8-22), and evaluation shows that CFL lies in an area of low peak acceleration, with CFL located approximately 15 miles from the closest earthquake that took place in Ontario. No plans are required for mitigatation since risks are not associated with such features, particularly those not present.

Item 6. Section B.15 presents the plugging and abandonment plan for wells IW#1-36N and IW#2-36E.

Item 7: Forms EQP 7200-1 and EQP 7200-14 present well construction information in both tabular (Form EQP 7200-1) and diagrammatic (EQP 7200-14) format. Forms for each well are presented at the end of Section A.3 (Form EQP 7200-1) and at the end of Section A.11 (Form EQP 7200-14). As also documented in other sections of this application, the proposed injection wells will have surface casing extending from surface through the base of the Bois Blanc, which is the lowermost USDW. Intermediate casing extending through the Niagara Group into the Clinton, and one long string protective casing extending from surface to the top of the injection interval, with an open hole completion from the base of the long string casing to total well depth. The annular space between all casings will be cemented to ground surface. All casing is designed to have cement circulated in annular spaces to ground surface. The annulus area between the protective (long-string) casing and the injection tubing string will be filled with inhibited fresh water. Annulus pressure will be continuously monitored to detect any leaks in the tubing or casing and annulus pressure will be maintained at pressures of more than 100 psi above the tubing pressure. All of these design features will prevent the movement of fluid that would endanger the lowermost USDW.

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

INJECTION WELL DATA

Supplemental information for drilling or converting to an injection well

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

INSTRUCTIONS: Complete all portions of form which apply to this well. **Attach supplemental documents as needed.**

Applicant
Republic Services of Michigan I, LLC
Carleton Farms Landfill
28800 Clark Road
New Boston, MI 48164

Well name and number
IW#1-36N

1. Notification information: provide name and address of the permittee of each oil, gas, and injection well and permitted location(s) within 1,320 feet of this proposed well, and the name and address of the last surface owner(s) of record within 1,320 feet of this proposed well.
2. File a separate plat which identifies the depth and location of this proposed well and all oil, gas, injection, and abandoned well within 1,320 feet. Also identify the permittee of each producing well within 1,320 feet of this proposed well, the surface owner(s) of record of the lands within 1,320 feet of this proposed well, and all freshwater, irrigation, and public water supply wells within 1,320 feet of this proposed well.
3. Enclose a copy of the completion reports for all wells and the plugging records for all plugged wells shown on the plat. Identify what steps will be necessary to prevent injected fluids from migrating up or into inadequately plugged or completed wells.
4. If this is an existing well to be converted to an injection well, enclose this form with a full permit application package per EQC 7200. Also enclose a copy of the completion report and geologic description and electric logs for this well.
5. Identify and describe all faults, structural features, karst, mines, and lost circulation zones within the area of review that can influence fluid migration, well competency, or induced seismicity. Include a plan for mitigating risks of identifiable features.
6. Attach a proposed plugging and abandonment plan (EQP 7200-6), along with a schematic detailing the depths, volumes, and types of cement and mechanical plugs, and depths where casing will be recovered.
7. Provide information demonstrating that construction of the well will prevent the movement of fluid that causes endangerment to an Underground Source of Drinking Water (USDW).

8. Type of fluids to be injected
☐ Brine ☐ Natural Gas (omit #10 & #15)
☐ Fresh Water (omit #15) ☒ Other Landfill leachate

9. Maximum anticipated daily injection rate (bbls/day or MCF/day)
2,743 bbl/d (80 gpm)

10. Specific gravity of injected fluid 1.00 to 1.06 (Max assumed as 1.06 plus 0.05 safety margin = 1.11)

11a. Maximum anticipated injection pressure 800

11b. Maximum injection pressure 808 psi

Show calculations (see R324.807) relative to top of Inj. Zone, 3,171'

3,171' * (0.74 psi/ft - (0.433 psi/ft * 1.11)) - 14.7 psi = 808 psi

12. Maximum bottom hole injection pressure 2,332 psi

Show calculations 808 psi + (3,171' * (0.433 psi/ft * 1.11)

13. Fracture pressure of confining interval

Show calculations (Top of Confining Interval) @ 2,227'

2,227' * 0.74 psi/ft = 1,648 psi

14. Fracture pressure of injection interval 2,428 psi

Show calculations (Top of Injection Interval) @ 3,281'

3,281 * 0.74 psi/ft = 2,428 psi (Casing Shoe)

15. Chemical analysis of representative samples of injected fluid

Specific conductance 11,730 - 16,391 (Conductivity; umhos/cm)

Cation (mg/l)		**Anions** (mg/l)	
Calcium	221 - 4,969	Chloride	9,709 - 46,656
Sodium	4,493 - 15,000	Sulfate	125 - 142
Magnesium	14 - 105	Sulfide	Not Analyzed
Total Iron	11 - 25	Carbonate	10
Barium	1 - 8	Bicarbonate	2,073 - 10,900

What was the source of this representative sample? Table B.9-1

Summary info from leachate analytical data from MSW and Ash Monofill; averages from each shown

16. Is this well to be completed in a potential, previous, or current oil or gas producing formation? ☐ Yes ☒ No

If yes, provide a list of all offset permittees and proof of service of notification of this application to all permittees by certified mail.

Schematic of wellbore construction

Complete bottom of diagram as needed to conform with proposed construction (e.g. show rat hole below casing, open hole completion, packer loc. etc.)

Underground Source(s) of Drinking Water formation name(s), top & bottom depths
USDW(s) Drift, Lucas, Sylvania, Bois Blanc
Depth to top 0 ft.
Depth to base 400 ft.

Vertical distance (in feet) between top of injection interval and base of deepest USDW

3,281' - 400' = 2,881'

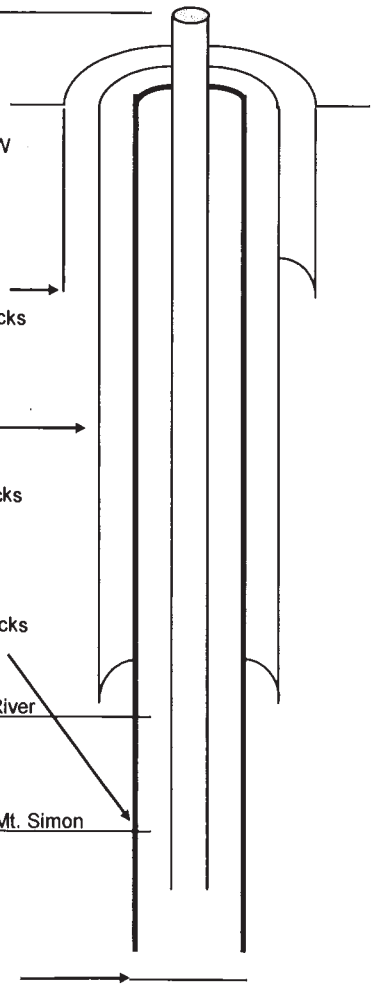
Surface casing 13 3/8 "x 500 '
Amount of cement 535 sacks
T.O.C. 0'

Intermediate casing (if applicable)
9 5/8 "x 1,400 '
Amount of cement 688 sacks
T.O.C. 0'

Long string casing 7"x 3,281'
Amount of cement 548 sacks
T.O.C. 0'

Confining Interval(s) Utica, Trenton, Black River
Depth to top 2,227'
Depth to base 3,171'

Injection Interval(s) Franconia-Eau Claire-Mt. Simon
Depth to top 3,281'
Depth to base 3,827'
Tubing 3 1/2" " x 3,231' '
Packer Depth 3,231'
Bottom TD or PBTD 3,827' ft



17. Application prepared by (print or type): Brent Goodsell, Area President
Signature
Date 5-4-20

EQP 7200-14 (rev. 5/2019) Enclose with *APPLICATION FOR PERMIT TO DRILL* or CONVERT

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY - OIL, GAS, AND MINERALS DIVISION

INJECTION WELL DATA

Supplemental information for drilling or converting to an injection well

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

INSTRUCTIONS: Complete all portions of form which apply to this well. **Attach supplemental documents as needed.**

Applicant
Republic Services of Michigan I, LLC
Carleton Farms Landfill
28800 Clark Road
New Boston, MI 48164

Well name and number
IW#2-36E

1. Notification information: provide name and address of the permittee of each oil, gas, and injection well and permitted location(s) within 1,320 feet of this proposed well, and the name and address of the last surface owner(s) of record within 1,320 feet of this proposed well.
2. File a separate plat which identifies the depth and location of this proposed well and all oil, gas, injection, and abandoned well within 1,320 feet. Also identify the permittee of each producing well within 1,320 feet of this proposed well, the surface owner(s) of record of the lands within 1,320 feet of this proposed well, and all freshwater, irrigation, and public water supply wells within 1,320 feet of this proposed well.
3. Enclose a copy of the completion reports for all wells and the plugging records for all plugged wells shown on the plat. Identify what steps will be necessary to prevent injected fluids from migrating up or into inadequately plugged or completed wells.
4. If this is an existing well to be converted to an injection well, enclose this form with a full permit application package per EQC 7200. Also enclose a copy of the completion report and geologic description and electric logs for this well.
5. Identify and describe all faults, structural features, karst, mines, and lost circulation zones within the area of review that can influence fluid migration, well competency, or induced seismicity. Include a plan for mitigating risks of identifiable features.
6. Attach a proposed plugging and abandonment plan (EQP 7200-6), along with a schematic detailing the depths, volumes, and types of cement and mechanical plugs, and depths where casing will be recovered.
7. Provide information demonstrating that construction of the well will prevent the movement of fluid that causes endangerment to an Underground Source of Drinking Water (USDW).

8. Type of fluids to be injected
☐ Brine ☐ Natural Gas (omit #10 & #15)
☐ Fresh Water (omit #15) ☒ Other Landfill leachate

9. Maximum anticipated daily injection rate (bbls/day or MCF/day)
2,743 bbl/d (80 gpm)

10. Specific gravity of injected fluid 1.00 to 1.06 (Max assumed as 1.06 plus 0.05 safety margin = 1.11)

11a. Maximum anticipated injection pressure 800 psi

11b. Maximum injection pressure 800 psi

Show calculations (see R324.807) relative to top of Inj. Zone, 3,141'

3,141' * (0.74 psi/ft - (0.433 psi/ft * 1.11)) - 14.7 psi = 800 psi

12. Maximum bottom hole injection pressure 2,310 psi

Show calculations 800 psi + (3,141' * (0.433 psi/ft * 1.11)

13. Fracture pressure of confining interval 1,627 psi

Show calculations (Top of Confining Interval) @ 2,198'

2,198' * 0.74 psi/ft = 1,627 psi

14. Fracture pressure of injection interval 2,406 psi

Show calculations (Top of Injection Interval) @ 3,251'

3,251' * 0.74 psi/ft = 2,428 psi (Casing Shoe)

15. Chemical analysis of representative samples of injected fluid

Specific conductance 11,730 - 16,391 (Conductivity; umhos/cm)

Cation (mg/l)		**Anions** (mg/l)	
Calcium	221 - 4,969	Chloride	9,709 - 46,656
Sodium	4,493 - 15,000	Sulfate	125 - 142
Magnesium	14 - 105	Sulfide	Not Analyzed
Total Iron	11 - 25	Carbonate	10
Barium	1 - 8	Bicarbonate	2,073 - 10,900

What was the source of this representative sample? Table B.9-1

Summary info from leachate analytical data from MSW and Ash Monofill; averages from each shown

16. Is this well to be completed in a potential, previous, or current oil or gas producing formation? ☐ Yes ☒ No

If yes, provide a list of all offset permittees and proof of service of notification of this application to all permittees by certified mail.

Schematic of wellbore construction

Complete bottom of diagram as needed to conform with proposed construction (e.g. show rat hole below casing, open hole completion, packer loc. etc.)

Underground Source(s) of Drinking Water formation name(s), top & bottom depths
USDW(s) Drift, Lucas, Sylvania, Bois Blanc
Depth to top 0 ft.
Depth to base 400 ft.

Vertical distance (in feet) between top of injection interval and base of deepest USDW

3,251' - 400' = 2,851'

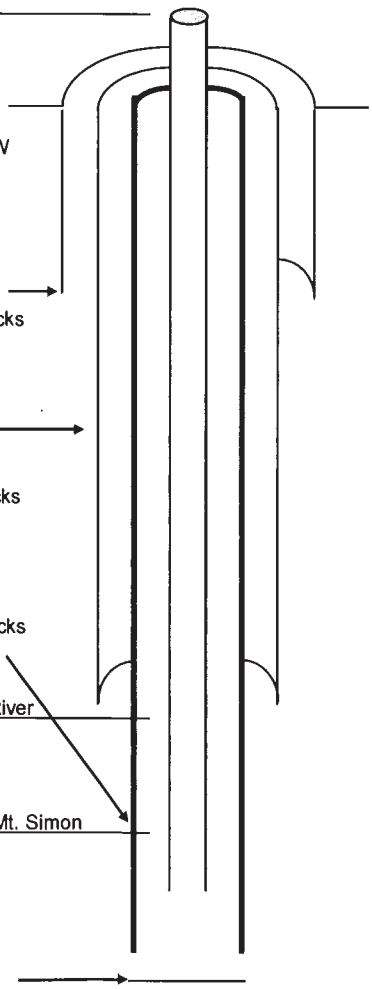
Surface casing 13 3/8 "x 500 '
Amount of cement 535 sacks
T.O.C. 0'

Intermediate casing (if applicable)
9 5/8 "x 1,400 '
Amount of cement 688 sacks
T.O.C. 0'

Long string casing 7"x 3,251'
Amount of cement 543 sacks
T.O.C. 0'

Confining Interval(s) Utica, Trenton, Black River
Depth to top 2,198'
Depth to base 3,141'

Injection Interval(s) Franconia-Eau Claire-Mt. Simon
Depth to top 3,251'
Depth to base 3,802'
Tubing 3 1/2" " x 3,301' '
Packer Depth 3,201'
Bottom TD or PBTD 3,827' ft



17. Application prepared by (print or type): Brent Goodsell, Area President
Signature
Date 5-4-20

EQP 7200-14 (rev. 5/2019) Enclose with *APPLICATION FOR PERMIT TO DRILL* or CONVERT

B.2 A calculation of the area of review in the injection interval over the anticipated life of the well. "Area of review" means either of the following:

A. For a well disposing of non-hazardous waste, that area the radius of which is the greater of 1/4 mile or the lateral distance in which the pressures in the injection zone are sufficient to increase hydrostatic head in the injection zone above the base of the lowermost underground source of drinking water, but not more than 2 miles.

B. For a well disposing of hazardous waste that area the radius of which is the greater of 2 miles or the lateral distance in which the pressures in the injection zone are sufficient to increase hydrostatic head in the injection zone above the base of the lowermost underground source of drinking water.

The IW#1-36N and IW#2-36E wells will be used for the injection of non-hazardous liquid waste generated on-site. To be conservative, a 2-mile area of review (AOR) is adopted for this permit as allowed by regulation. The cone-of-influence (COI) is anticipated to be smaller than the statutory value of 2-miles. A conservative fixed radius of 2,000 feet has been defined for the evaluation of freshwater artificial penetrations. These AOR radii have both been applied from the property boundary of the CFL. Freshwater well data for penetrations located within the area defined by a 2,000 foot radius have been identified from state files and submitted. See Figure A.4-6 at the end of Section A.4 for a summary of shallow freshwater penetrations. Figure B.4-1 at the end of Section B.4 provides a summary of all deep non-freshwater penetrations. As noted in Section B.4, five of these deep wells penetrate into but not through the confining zone, and do not extend into the injection zone within the two-mile AOR. The closest well (API No: 21163192140000, Permit 19214) is located approximately 5,415 feet (1.03 miles) from the CFL property boundary and approximately 7,840 feet (1.48 miles) from the IW#1-36N well location. Nearby wells that penetrate the injection zone include the three Class I UIC non-hazardous wells (one plugged and abandoned [Well #1-20] and two operational wells #1-12 and #2-12) at the EDS facility, located approximately 7 to 11 miles to the northeast. Deep well data are included as Attachment C (CD-ROM).

B.3 A discussion of the affect of injection on the present and potential mineral resources in the area of review.

As shown on Figure B.4-1 and detailed in Section B.4, five non-freshwater wells were drilled within two miles of the CFL property boundary. These wells penetrate to the Trenton Formation, and were installed to assess the presence of oil and gas within this unit. However, all five were subsequently plugged and abandoned, and none of the wells extend completely through the confining zone to the proposed injection zone. Therefore, there will be no effect of injection on the present and potential mineral resources in the area of review because the proposed injection zone is not an oil and gas bearing interval, and there are no known resources in units above the proposed injection zone.

B.4 A plat which shows the location and total depth of the proposed well, shows each abandoned, producing, or dry hole within the area of influence, and each operator of a mineral or oil and gas well within the area of influence.

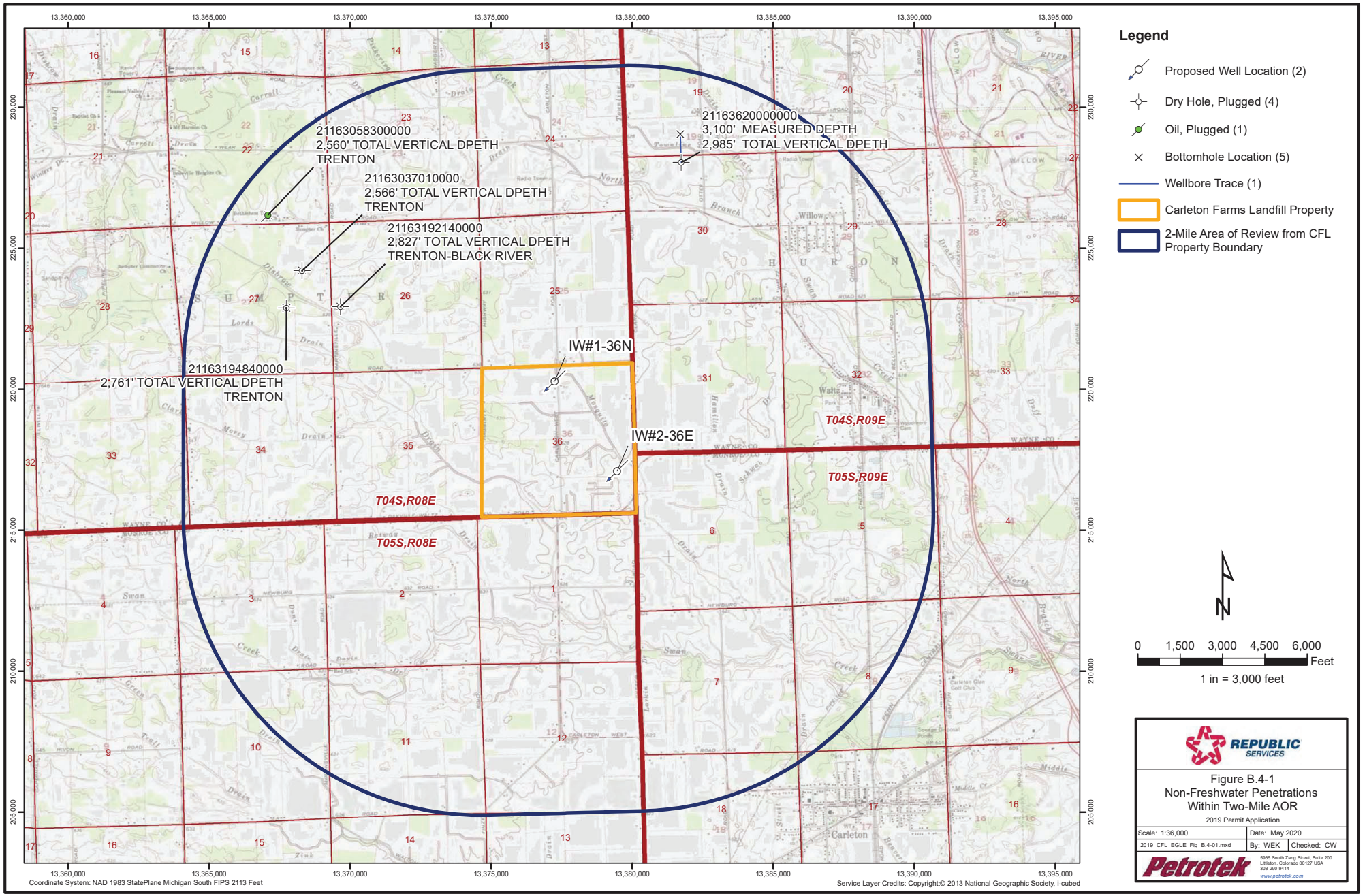
Figure B.4-1 shows the locations of the proposed wells and all non-freshwater artificial penetrations (i.e., oil and gas wells) within and around the two-mile Area of Review (AOR). Records available at the Michigan Department of Environmental Quality (MDEQ) as of August, 2019, were examined. Table B.4-1 presents a summary of the identified non-freshwater artificial penetrations within the two-mile AOR that includes pertinent well information, formations, and depths.

There are five deep non-freshwater artificial penetrations identified in the two-mile AOR as presented on Figure B.4-1. Data for these wells, including depth and formation information are provided in Table B.4-1. None of the five wells permitted and/or drilled in the vicinity of the facility within the two-mile AOR fully penetrates the confining zone composed of the Utica Shale, Trenton Formation, and Black River Formation. Wells were drilled to or into the Trenton formation, and were drilled to explore for oil and gas within the Trenton Formation, which is a productive unit elsewhere in southeastern Michigan. These wells do not serve as potential pathways for fluid migration out of the permitted injection zone, since they do not fully penetrate through the confining zone or reached the injection zone. Section B.6 includes the plugging records for these wells. Additionally, Section B.6 includes a conservative calculation assuming an artificial presence of an open conduit at the closest well to the proposed injection well locations, Permit 19214, which demonstrates that even if a conduit were present at this location it would pose no issue with respect to migration of fluid from the injection interval. Therefore, no wells have any potential to serve as a vertical migration pathway from the proposed injection interval.

Freshwater wells are shown on Figure A.4-6a and A.4-6b, as presented in Section A.4.

Table B.4-1. Non-Freshwater Artificial Penetrations within the Area of Review

API Well No.	Permit No.	Well Type	Well Status and date	Total Depth (RKB)	Formation at Total Depth	Field Name	Co Name	T-R-S
21163037010000	3701	DH	Plugged and Abandoned	2,566	Trenton	NA	PONTCHARTRAIN PETROLEUM CORP	4S-8E-27
21163058300000	5830	OIL	Plugged and Abandoned	2,560	Trenton	Sumpter	BONANZA OIL AND GAS CORP	4S-8E-22
21163192140000	19214	DH	Plugged and Abandoned	2,827	Trenton-Black River	NA	UHL JACK	4S-8E-26
21163194840000	19484	DH	Plugged and Abandoned	2,761	Trenton	NA	UHL JACK	4S-8E-27
21163620000000	61290	DH	Plugged and Abandoned	3,100' (measured depth)	Top of Black River	NA	SAVOY ENERGY LP	4S-R9E surface: Section 30 bottom hole: Section 19



REPUBLIC SERVICES

Figure B.4-1
Non-Freshwater Penetrations
Within Two-Mile AOR
2019 Permit Application

Scale: 1:36,000	Date: May 2020	
2019_CFL_EGLE_Fig_B.4-01.mxd	By: WEK	Checked: CW

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303-290-9414
www.petrotek.com

B.5 If a well is proposed to be converted to a disposal well, a copy of the completion report, together with the written geologic description log or record and borehole and stratum evaluation logs for the well.

Conversion of an existing well is not proposed. Upon installation of the new well, copies of the written geologic description and all log data collected from the well will be submitted to EGLE.

B.6 Plugging records of all abandoned wells and casing, sealing, and completion records of all other wells and artificial penetrations within the area of influence of the proposed well location and a map identifying all such artificial penetrations. An applicant shall also submit a plan reflecting the steps or modifications believed necessary to prevent proposed injected waste products from migrating up, into, or through inadequately plugged, sealed, or completed wells.

Topographic Map

A copy of the USGS Topographic map with the outline of the conservative maximum two-mile radius area of review and disposal well symbols representing the proposed well locations, is included as Figure A.4-4. (See Section A.4). This topographic map extends in excess of two miles beyond the CFL boundary. CFL encompasses Section 36, T4S, R8E. Figure A.4-4 shows the location of all known surface bodies of water and roads within two miles. There are no known springs, mines, or quarries within the two-mile radius. Figure A.4-5 presents an aerial view of the CFL site area. A listing of property owners within a ¼-mile radius of the CFL is provided below in Table B.6-1 and these parcels are shown on Figure B.6-1. Property parcel records for Wayne County were downloaded via shapefile from the county's Open Data site (Wayne County, 2019). Property parcel records for Monroe County were sent via shapefile from Monroe County, after a request directed to the Monroe County Planning Commission. No known hazardous waste treatment storage or disposal facilities are present within the AOR based on available State of Michigan permit information.

Artificial Penetrations

Figure B.4-1 (Section B.4) shows the location of all non-freshwater artificial penetrations within the two-mile radius of the CFL property boundary and in the surrounding areas, based on data provided from EGLE as of August, 2019. API numbers are shown at each well symbol. General geographic features and the outline of the required two-mile AOR are also shown on the map. There are five deep artificial penetrations within the AOR (Table B.4-1 and Section B.4); plugging information is available for the five wells. Note that while these wells penetrate into or through the Trenton Formation, none of these wells fully penetrate the entire confining zone, meaning that these wells do not penetrate the Black River into the injection zone or injection interval within the AOR. Table B.6-2 summarizes the available plugging information for these wells, and all available well and plugging records are provided in Attachment C (CD-ROM).

Table B.6-1. Property Parcels within ¼-Mile Radius of CFL

Figure Label	Owner Name	Property Street	City	State	ZIP	Mailing Address	Mail State	Mail ZIP	Property Class
1	INTERNATIONAL TRANSMISSION CO.	CARLETON WEST RD	BELLEVILLE	MI	48111				
2	INTERNATIONAL TRANSMISSION CO.	HAGGERTY RD	BELLEVILLE	MI	48111				
3	ANCHORS REALTY LLC	CARLETON WEST RD	BELLEVILLE	MI	48111				
4	CHIEF FINANCIAL OFFICER	HAGGERTY RD	BELLEVILLE	MI	48111				
5	CHIEF FINANCIAL OFFICER	CARLETON WEST RD	BELLEVILLE	MI	48111				
6	CHIEF FINANCIAL OFFICER	HAGGERTY RD	BELLEVILLE	MI	48111				
7	CHIEF FINANCIAL OFFICER	HAGGERTY RD	BELLEVILLE	MI	48111				
8	CITY ENVIRONMENTAL SERV	CLARK RD	NEW BOSTON	MI	48164				
9	CITY ENVIRONMENTAL	CLARK RD	NEW BOSTON	MI	48164				
10	CHIEF FINANCIAL OFFICER	ARKONA RD	BELLEVILLE	MI	48111				
11	CITY ENVIRONMENTAL	CLARK RD	NEW BOSTON	MI	48164				
12	CITY ENVIRONMENTAL	27671 CLARK RD	NEW BOSTON	MI	48164				
13	CITY ENVIRONMENTAL	27621 CLARK RD	NEW BOSTON	MI	48164				
14	CITY ENVIRONMENTAL	27605 CLARK RD	NEW BOSTON	MI	48164				
15	CITY ENVIRONMENTAL	CLARK RD	NEW BOSTON	MI	48164				
16	INTERNATIONAL TRANSMISSION CO	CLARK RD	NEW BOSTON	MI	48164				
17	INTERNATIONAL TRANSMISSION CO.	CARLETON WEST RD	BELLEVILLE	MI	48111				
18	CITY ENVIRONMENTAL	OAKVILLE WALTZ RD	NEW BOSTON	MI	48164				
19	BILBREY DANNY RAY TRUST	CARLETON WEST RD	CARLETON	MI	48117	14604 CARLETON WEST RD	MI	48117	Residential
20	GILMER JANET	EXETER RD	CARLETON	MI	48117	PO BOX 512	MI	48117	Residential
21	KONOPKA RALPH & EVELYN	EXETER RD	CARLETON	MI	48117	14455 EXETER RD	MI	48117	Residential
22	LAWSON MICHAEL & LISA	CARLETON WEST RD	CARLETON	MI	48117	14594 CARLETON WEST RD	MI	48117	Residential
23	OLSON CLIFFORD JAY	OAKVILLE WALTZ RD	NEW BOSTON	MI	48164	3605 OAKVILLE-WALTZ RD	MI	48164	Commercial
24	OLSON CLIFFORD JAY & JUNE C	OAKVILLE WALTZ RD	NEW BOSTON	MI	48164	3605 OAKVILLE WALTZ RD	MI	48164	Residential
25	OUSLEY MARIANNA & TABORSKI DAVID G	EXETER RD	CARLETON	MI	48117	14465 EXETER RD	MI	48117	Residential
26	REPUBLIC SERVICES OF MICHIGAN I LLC	OAKVILLE WALTZ RD	NEW BOXTON	MI	48134	18500 NORTH ALLIED WAY	AZ	85054	Agricultural
27	REPUBLIC SERVICES OF MICHIGAN I LLC	EXETER RD	NEW BOSTON	MI	48164	18500 NORTH ALLIED WAY	AZ	85054	Agricultural
28	REPUBLIC SERVICES OF MICHIGAN I LLC	EXETER RD	NEW BOSTON	MI	48164	18500 N ALLIED WAY	AZ	85054	Agricultural
29	REPUBLIC SERVICES OF MICHIGAN, LLC	CARLETON WEST RD VACANT	CARLETON	MI	48117	18500 NORTH ALLICA WAY	AZ	85054	Industrial
30	REPUBLIC SERVICES OF MICHIGAN, LLC	OAKVILLE WALTZ RD	CARLETON	MI	48117	18500 NORTH ALLICA WAY	AZ	85054	Industrial
31	REYNOLDS KIMBERLY & MICHAEL	CARLETON WEST RD	CARLETON	MI	48117	14017 CARLETON WEST RD	MI	48117	Residential
32	ROBERTS DEBRA A	EXETER RD	CARLETON	MI	48117	14525 EXETER RD	MI	48117	Residential
33	SIBOLOSKI THELMA L	EXETER RD	CARLETON	MI	48117	14656 EXETER RD	MI	48117	Residential
34	STEVENS JAMES & BEVERLY	OAKVILLE WALTZ RD VAC	CARLETON	MI	48117	10702 S STONY CREEK	MI	48117	Residential
35	STEVENS JAMES TREVOR & BEVERLY ANN	EXETER RD VACANT	CARLETON	MI	48117	10702 S STONY CREEK	MI	48117	Residential
36	STEWART GRANT & CHARLINA	EXETER RD	CARLETON	MI	48117	4391 YARMOUTH	MI	48197-	Agricultural
37	STEWART GRANT & CHARLINA TRUST	EXETER RD	CARLETON	MI	48117	4391 YARMOUTH	MI	48197	Agricultural
38	STRIMPEL OLGA M TRUST	OAKVILLE WALTZ RD	CARLETON	MI	48117	4501 OAKVILLE WALTZ RD	MI	48117	Agricultural
39	WILSON CLARENCE E & LYNDIA L	OAKVILLE WALTZ RD	NEW BOSTON	MI	48164	3695 OAKVILLE WALTZ RD	MI	48164	Residential
40	WILSON WILLIAM & JULIE	NEWBURG RD VACANT	CARLETON	MI	48117	14475 CARLETON WEST RD	MI	48117	Agricultural